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Final Report

# ORGANIZING THE LOCALITY FOR EMERGENCY OPERATIONS

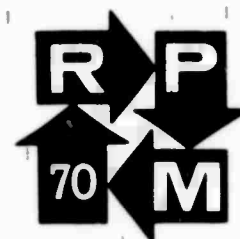
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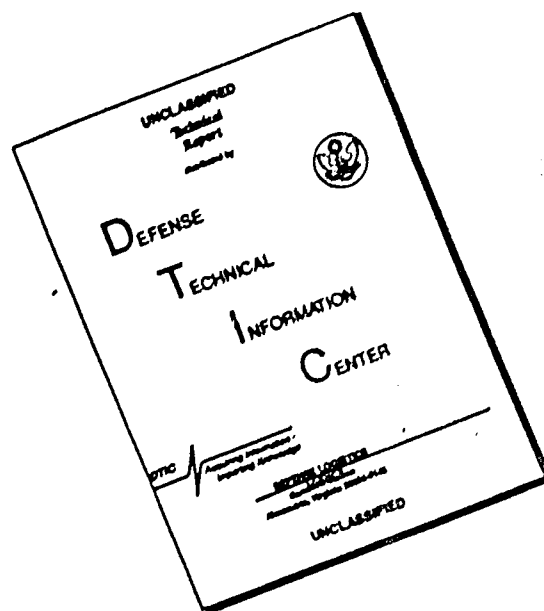
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Final Report

# ORGANIZING THE LOCALITY FOR EMERGENCY OPERATIONS

By

John F. Devaney

Prepared For

Defense Civil Preparedness Agency  
Department of Defense  
Washington, D.C. 20301

April 1972

Contract No. DAHC20-71-C-0291

DCPA Work Unit 2612B

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This report has been reviewed in the Defense Civil Preparedness Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Defense Civil Preparedness Agency.

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## SCOPE OF WORK

The work reported here was performed for the Defense Civil Preparedness Agency. The Scope of Work was defined in Contract No. DAHC20-71-C-0291 as follows:

### Article I. Scope of Work - Evaluation of Local Emergency Organization (26128).

A. General - The Contractor, in consultation and cooperation with the Government, shall furnish the necessary facilities, personnel, and such other services as may be required to perform an evaluation of local emergency organizations. The work and services shall be performed as specifically provided herein.

B. Specific Work and Services - The Contractor shall perform specific work and services as follows:

1. Extend the analysis in Chapter IV of the prior study "Use of Systems Techniques in Civil Defense", to develop more fully the objective criteria for defining the preferred organization for local emergency operations under nuclear attack conditions.

2. Review and summarize past concepts, practices, and recommendations for local civil defense emergency organizations, including applicable military and foreign civil defense organization experience.

3. Evaluate the various possible local civil defense organizational concepts in light of the analytical criteria and define the preferred organization and the deviations therefrom that would appear acceptable for efficient operations.

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## I. INTRODUCTION

### PURPOSE

A nuclear attack on the United States would pose a real emergency: the normal ways of doing things would not work. When it came, things would happen quickly; the time for getting ready would have gone and with it the time for inter-office memos, ad-hoc committees, and all other such trappings of modern enterprise--industry and government alike. The job to do would be large, the time short, and the resources none too plentiful. The survival of many of our compatriots and much of our property would depend on getting the most out of the available resources, or rather, having our affairs arranged so that those who must do the civil defense operating job can get the most out of what is available to them.

People have long understood that, when more than one man were required to do a job, their effectiveness and efficiency could be improved by coordinating their work. This meant appointing a supervisor--as Karl Marx said, an overlooker--who would make the plan, assign the work, and set the time. And as enterprises became larger, more supervisors were added at higher levels until they resembled a pyramid of supervision from a supreme authority at the top to the many workers at the bottom called: the organization.

Thus, it is not new to understand that civil defense needs be organized for emergency operations. To organize goes without saying. But over the years, people have come to understand that the labyrinth within the organization's pyramid of authority could be arranged in different ways. In other words, organizations can have a variety of forms. Any form can be made to work for any enterprise, given the good will of the group and a genuine desire to make it work. But for any one enterprise, one form of organization will produce more effectiveness and efficiency than the others, or conversely, the others will cost more in money, time, and effort to produce equal effectiveness and efficiency.

Therefore, there must be a one best organization for civil defense

emergency operations, not one for all localities, but one for each locality. Localities--cities, towns, counties--vary as widely as the people who make them up--in size, in shape, and in the problems they face. And what would work best in one might not in another.

The Office of Civil Defense is charged with aiding and guiding the States and their subordinate political subdivisions in developing a civil defense operating capability. In doing the part of this job relating to organizing for emergency operations, it would have been convenient to offer a "standard organization" in a neat package and to say, "Do this." But this is not possible. So it seemed more reasonable to offer guidance as to how each locality could go about organizing itself so that it could best use what it had for civil defense emergency operations.

The purpose of this study is to demonstrate a method of organizing for emergency operations in a way that would serve as a basis for teaching how to organize.

#### THE STUDY

This study was an outgrowth of Chapter IV of, The Use of Systems Techniques in Civil Defense<sup>1/</sup> in which there was a brief demonstration of the application of systems analysis techniques in organizing. Its first step was a review of the literature--what had been said of organizing and organizations.

The review of the literature examined the general theory and practice of organizing and the practice of organizing for emergency operations--in European civil defense and in the armed forces of the United States. In the area of general theory and practice, it was found, as Marsh and Simon noted, that little had been said about organization but it had been said over and over in a wide variety of languages.<sup>2/</sup> Two conclusions were drawn from the literature review:

1. That the primary purpose of organizing is to provide for the making and influencing of decisions in the coordination of individual effort and that efficiency is the best criterion for choice among organization alternatives, and
2. The traditional "principles" of organizing are really untested

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1. John F. Devaney, The Use of Systems Techniques in Civil Defense, URS Research Co., (Washington: 1970)
  2. James G. Marsh and Herbert A. Simon, Organizations, John Wiley, (New York, 1958.)

hypotheses but should be considered in the design of an organization.

Dale suggested that comparative analyses in which the similarities and differences between different situations would be taken into account would be a logical framework for study of organizing.<sup>1/</sup> But Parkinson suggested that efficiency experts guessed which organization was best and criticized others for not being the same.<sup>2/</sup> Simon suggested a simple framework in which the influencing of individual behavior in decision making would be the central idea.<sup>3/</sup> We chose to go Simon's route, considering such of the traditional "principles" as were appropriate.

From the review of organizing practice in emergency organizations the most significant findings come from the operating organization of the U.S. armed forces: services, unified commands, and task forces. The organization plan derived in the study to exemplify the process employs these concepts, most importantly the unified command idea. The operating headquarters at metro, zone, and section described herein are equivalent to unified commands.

In the study, the organizing considerations were applied to the emergency operations. It was found necessary in this process to further subdivide the operations in considerably more detail than had been satisfactory in previous studies. It was also found desirable to substitute the term "operations" for the two terms "functions" and "controls". These two latter terms are convenient for systems analyses; they are not needed and tend to overcomplicate the study of organizing.

The focus on decision making required analysis in depth of the operating decisions to be made. In order for this analysis to be related better to what appears to be current thought with respect to emergency operations, the operating doctrine on which this analysis was based and which is reflected in the resulting organization plan was derived from ALFA NEOP.<sup>4/</sup> The organizing process requires an operating plan and

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1. Ernest Dale, The Great Organizers, McGraw-Hill (New York: 1960).
  2. G. Northcote Parkinson, In-Laws and Outlaws, Houghton-Mifflin, (Boston: 1962).
  3. Herbert A. Simon, Administrative Behavior, 2nd ed., McMillan, (New York: 1957).
  4. Office of Civil Defense, ALFA NEOP-EOC Master Check List, FGG-1.2/2, (Washington: April 1971).

doctrine from which to derive the operational assignments to elements of the organization. However, it is to be expected that some changes in the operations plan and doctrine may prove desirable to achieve added efficiency in the organization.

In the present study, it was found necessary to invent some operating practice in order to demonstrate the organizing process. Where this was done, it was only for the purposes of this study and it was done without the kind of analysis that development of operating practices deserves.

#### DEFINITIONS

In the literature about organizations, the term "organization" is used to mean both the process and the result and "organizing" to mean the process. This does not cause insurmountable, or even vexing, problems. But it does violate Borsodi's maxim for a disciplined vocabulary:

One word, one meaning; one meaning, one word.<sup>1/</sup>

Therefore, in this paper, the following will be used:

Organizing is the process of designing and building a structure of people for the administration of work to be performed by a group acting in cooperation, assigning them duties and authority, and supplying them with the necessary operating rules, procedures, and resources.

Organization is a group of people acting in cooperation to perform work together with the necessary rules, procedures, and resources.

#### THE REPORT

The remainder of this report contains the following:

Chapter II, Organizing: a brief summary of the review of the general theory and practice of organizing and of the practice of organizing emergency organizations.

Chapter III, Departmentation: An examination of the grouping of emergency operations for administration; an identification of civil defense services; and a tentative assignment of emergency operations to them.

Chapter IV, Decentralization: a discussion of coordination of emergency operations; a discussion of decision making and levels of management;

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1. Ralph Borsodi, The Definition of Definition, Porter Sargent (Boston: 1966).



introduction of the staff concept and tentative assignment of operations to the staff.

Chapter V, Structure: a discussion of the organizational elements required at each level of the organization; introduction of partial organization charts.

Chapter VI, Information: an examination of the requirements for information and the sources introducing the critical decision/critical indicator analysis; a description of the necessary information flow.

Chapter VII, Describing the Organization: a brief review of the organizing process; a discussion of organization charts and manuals with examples.

Chapter VIII, Alternatives: A review of the major sets of alternatives considered in the process of developing an organization pattern in this study.

Appendix A; ALFA NEOP Events: A listing of the coding of ALFA NEOP events for convenience in using them in the study.

Appendix B; Departmentation Analyses: Presentations of the results of detailed analyses for the discussion in Chapter III.

Note: At a number of places in the texts, matrix-type figures -- drawings having rows and columns with indicating marks in some of the spaces -- to illustrate the method for technicians who might desire to use it in other studies. It is not essential that other readers understand these figures thoroughly -- or at all -- in order to follow the argument.

## II ORGANIZING

### HISTORY

Organizing first was necessary when a man had a job to do that he could not do alone and he got another man to help him. The earliest large organizations arose in government and religion. Until the industrial revolution, most businesses were small: owned and directed by one man. With the increased productivity made possible by new machines and sources of power, some companies became so profitable that they could expand and acquire other companies. These expanded companies outgrew the ability to operate under "one-man" rule. The economy and society itself became more complicated; the amount of knowledge grew; and the amount of knowledge needed to manage grew.

The practice of organizing moved in two directions. Starting with work measurement studies, Frederick W. Taylor developed a theory of management in which many supervisors replaced the one. His idea was that each supervisor could do a better job if he were concerned with as few functions as possible. Harrington Emerson suggested an alternative -- adapted in part from the military. In his theory, the "one-man" line supervisor was given "staff" assistants to advise him and his operating subordinates. About the same time, "practical" executives -- notably Fayol in France and the younger DuPonts and their associates in the United States -- applied common sense to observations of their experience and developed other methods for organizing. They identified organizing as an art rather than a science -- a tool for management rather than an end in itself -- and related work assignment to objectives.

Students of the theory of organizing drew upon the work of these people and identified a number of "principles" of organizing that could be universally applied. Writers in the years just before World War II developed schools of "scientific" thought overlooking the common-sense beginnings and the fact that their propositions were based neither in logic nor in experiment. Out of these schools came the scientific-appearing "principles" that Simon called "proverbs."<sup>1/</sup>

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1. Herbert A. Simon, Administrative Behavior, 2nd ed., McMillan, (New York: 1957).

## ORGANIZING THEORY

### The Modern Organization

Group activity has existed ever since it was first recognized that two men could do a job better, quicker, or cheaper than one. Since then, groups have been organized in various ways -- generally in some form of patriarchy or family -- until today most group activity is organized in what Max Weber described as a bureaucracy which has:<sup>1/</sup>

- a. Fixed jurisdictional areas with official duties, delimited authority to command, and provision for continuous performance of duties by qualified people.
- b. Graded levels of authority.
- c. Operation based on written documents.
- d. Specialized activity based on thorough training.
- e. A demand for full working capacity of the official.
- f. Rules that are stable and can be learned.

### Organizing "Principles?"

All writers on the theory and process of organizing discuss a set of "principles" on which opinions vary. Dale, in 1965, characterized them as those of the classical theorists and noted that some newer theorists held differing views.<sup>2/</sup> Simon -- one of the newer theorists mentioned by Dale -- took a violently different view.<sup>3/</sup> He noted that most of these principles come in pairs and that, although the two will lead to exactly opposite recommendations, they do not indicate in any way which is the proper one to use.

The classical principles generally mentioned are:

1. Specialization: division of the work so that each man will have as few functions as possible to perform.
2. Unity of Direction: one head, one plan for each activity.
3. Unity of Command: each person, only one boss.
4. Authority: equal to responsibility.
5. Coordination: means provided for directing all efforts toward a common goal.
6. Scalar: A supreme authority and a clear line of authority from it to every individual.
7. Efficiency: Organization planned to obtain objective at lowest cost.

- 
1. H. H. Garth and C. Wright Mills, From Max Weber; Essays in Sociology, Oxford University Press (Fairlawn, N.J.: 1958).
  2. Ernest Dale, Management Theory and Practice, McGraw Hill (New York: 1965).
  3. Simon, Administrative Behavior.

8. Delegation: decisions made at lowest competent level.
9. Span of Control: No superior over more than six immediate subordinates whose work is interrelated.
10. Short Chain of Command: As few levels of management as possible between supreme authority and rank and file.
11. Balance: (a) between standardization and flexibility, (b) between centralization and decentralization, (c) in size, between departments, (d) between span of control and short chain of command.

#### Organizing for Decision Making

Simon noted that administration -- the management of an organization -- is ordinarily discussed in terms of "getting things done". He noted that little attention had been given to the choice that precedes the doing: the deciding of what is to be done. He held that a general theory of administration must include principles of organizing that will insure effective action in choosing as well as in doing.

The task of carrying out an organization's objectives -- doing the physical work -- falls to the persons at the lowest level of the hierarchy. Those above them in the hierarchy have an essential role in influencing the decisions of the operatives at the lowest level. The operative's immediate supervisor and those in the levels above him are each subject to influences from above and they transmit, elaborate, and modify those influences before they reach the operatives.

Organizing, then, is a process of setting up an operating staff and superimposing on it a supervisory staff capable of influencing the operating group toward a pattern of coordinate and effective behavior. Transmission, elaboration, and modification of influences -- the work of the supervisor -- all involve the making of decisions. So do the operations performed by the operator. The behavior of the whole organization, then, involves a complex network of decision processes all of which precede action.

#### Organizing for Efficiency

In building the structure for decision-making, alternatives are found from which choices must be made. Simon proposes efficiency as the criterion. In this use, the criterion of efficiency demands that,

- a. of two alternatives having the same cost, the one be chosen that will lead to the greater attainment of the organization's objectives, or
- b. of two alternatives leading to the same degree of attainment, the one be chosen that will entail the lesser cost.

The objective of the organizing function, then, can be stated simply: To build an administrative structure to permit decision-making and the influencing of decision-making so as to maximize efficiency. Simon suggests that the "principles" are really "points to be considered" in the design of the decision structure to achieve efficiency. In this light, the alternatives can be judged as to whether they would increase or decrease efficiency and one chosen for use in the case being considered.

#### DECISION

All behavior involves conscious or unconscious selection of particular actions out of all those that are physically possible to the actor. By some process, the number of alternative actions are narrowed down to the one that is acted out. This process may consist of self-conscious, deliberate, rational selection. It may consist of a reflex without any element of deliberation or consciousness. But however much deliberate selection or reflex action is contained, the process will be called here "decision" or "choice", interchangeably.

A decision is a statement about a future state of affairs that selects one future in preference to others and directs behavior so as to achieve it. A decision, then, is based on two kinds of premises:

- a. fact: a statement about the observable world and the way it operates that can be tested to find whether or not it is true.
- b. Value: a property of a thing because of which it is esteemed, desirable, or useful that is signified by such ethical terms as, "ought," "good," or "preferable" and cannot be reduced to factual terms.

The decision-making process starts with some ethical premise -- taken as a "given" -- that describes the objective of the organization. Judgement enters the process because it is necessary to choose factual premises whose accuracy cannot be known with the information or within the time available. This element of judgement is often confused with the ethical element in a decision.

Some goals are sought for their own sake; others are way-stops on the path to more distant goals. In organizational behavior, the means-end hierarchy is seldom an integrated, completely-connected chain and the connection between organizational activities and their ultimate objectives is often obscure. Rational organizational behavior requires selection of alternatives that contribute to objectives in the light of this means-end chain with all its incompleteness, inconsistencies, and contradictions. Time must also be a consideration in rational decision-making because some decisions are irrevocable; once made they create a new situation affecting all future decisions.

#### Alternatives and Consequences

The decision process involves three steps:

- a. All of the alternative strategies are listed -- these are a series of decisions over time.
- b. The consequences that would follow each of these strategies are estimated or predicted.
- c. These sets of alternative consequences are evaluated comparatively.

Of course it is impossible for the decision-maker to know all possible strategies or all of their consequences. Nor can he know directly the future consequences of the selected behavior. In reality, he forms a set of expectations of future consequences based on known empirical relationships and on information about the present situation.

In group action, for each member of the group to estimate the consequences of his actions, he must know what the actions of the others will be. A major purpose of organizing is to permit each member of the group to form accurate expectations as to what the others are going to do. Coordination is the process of informing each as to the planned behavior of the others. The individual members of the group cannot ordinarily be left to themselves to select the strategies that will lead to the objectives because the selection of the correct strategy for the individual requires knowledge of those selected by the others. Therefore, cooperation will usually be ineffective without coordination.

#### Purposive Behavior

Individuals and organizations alike are "teachable"; they go through first a stage of exploration and inquiry and then one of adaptation.

Memory is an important basis of rational behavior. When similar situations arise, the memory brings up information gathered and conclusions reached before and thus reduces the necessity for new inquiry. Memory can be natural or artificial; the information may be stored in the mind or recorded in files, in a computer, in a library, and so on.

Habit preserves useful behavior patterns. It saves mental effort by placing repetitive aspects of the situation in the subconscious where they can bring about reflexive action. Organizations have an artificial counterpart to habit in "organization routine." Matters are settled in organization routine by reference to accepted or approved practices rather than by consideration of the alternatives on their merits.

#### EFFICIENCY

In commercial organizations guided by the profit motive, efficiency involves (1) maximization of income if costs are fixed, (2) minimization of cost if income is fixed, or (3) more precisely, maximization of the excess of income over cost. The simplicity of this efficiency criterion is due chiefly to the fact that, for such an organization, money is the common denominator for measuring input and output and permits them to be compared directly.

In most organizations -- commercial and noncommercial -- the "input" factor can be measured largely in terms of money. But in public administration some substitute must be found for money as a measure of output value. The required substitute is found in the statement of the objectives of the activity and in the development of indices by which to measure the degree of attainment of these objectives -- not an easy task.

In searching for a decision, a fundamental problem is the discovery of a common denominator between the two values: low cost and large results. Given two alternative courses of action, if the one costs less and produces more than the other, the choice is unequivocal; the first is always preferable. But if one costs less and produces less than the other, preferability of either is not clear. In this case cost must be weighed against result before a choice can be made and it may be found that neither result is worth the cost.

The administrative decision can always be framed as a choice among



alternatives involving the same cost, but different positive values. The criterion of efficiency, then, says

The alternative should be chosen that produces the largest result for the given application of resources.

The term "efficiency" is used in the physical sciences to mean the ratio of output to input. In the social sciences it is used -- particularly by the practitioners of scientific management -- to mean the ratio of actual performance to the performance that might be achieved. As used here, "efficiency" takes more nearly the second of these meanings. But actual administrative problems are always concerned with relative efficiencies and no measure of absolute efficiency is needed. It is sufficient to be able to say that one alternative is more or less efficient than another, so long as the two efficiencies are measured in the same way.

#### COORDINATION

Most writers on organizing theory and practice write of the use of the organization to achieve coordination of the work. Many of them hold that coordination is the central purpose of organizing. That this should be so is not difficult to see. The output of one individual can be increased by specialization, i.e., by reducing the number of different skills he must have. Then when an operation is divided into a number of specialized tasks and each is given to one man, the output of the group can be greater than could be achieved without the specialization. But the output will be greater only if the doing of each of the specialized tasks is carefully fitted to that of each of the others in method, timing, and so on. This fitting is coordination.

Coordination is provided for in organizing chiefly in departmentation: the division of work. How the various tasks -- or, rather, the men performing them -- are assembled into units and how these units are assembled into larger divisions can aid in or interfere with coordination. Gulick held that the efficiency of a group working together was directly related to the homogeneity of the work they did, in process, purpose, or technology.<sup>1/</sup>

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1. Luther Gulick, "Notes on the Theory of Organization" in Luther Gulick and Lyndall F. Urwick, Papers on the Science of Administration, Institute of Public Administration, (New York: 1937).



Urwick suggested that the best evidences of failure to achieve the desirable level of coordination are (1) a proliferation of committees and (2) a petrification of leadership.<sup>1/</sup> Committees can "think" together, i.e., plan or review; they do not "act" together well. But coordination is an exercise of authority and this is a matter for an individual not a group. Therefore, it seems that committees can aid in coordination thru planning but they do indicate a deficiency in coordination when they are concerned with doing the work.

#### COOPERATION

Cooperation is another way of achieving harmonious joint effort. But here there is no exercise of authority. Instead an idea dominates and the separate individuals have one purpose and are of one mind so that each will voluntarily fit his effort with that of the group.<sup>2/</sup> When each does his part with skill and enthusiasm, much can be accomplished toward achieving the purpose of the group.

Cooperation is required in addition to, not in place of, coordination. The exercise of authority in coordination has two elements: (1) commands by the superior and (2) acceptance of commands by the subordinate. Cooperation, then, aids in coordination by inducing the superior to issue acceptable commands and the subordinate to accept commands he receives. It is neither desirable nor feasible to extend coordination to each and every operation that involves two or more workers. The cost of coordination would be excessive and over-coordination would reduce the benefits of initiative and resourcefulness on the part of the workers. Unity of effort in these uncoordinated efforts is achieved by cooperation.

#### COMMUNICATION

No joint effort by two or more men is possible without communication: the exchange of ideas from the mind of one to the mind of another. This is so whether the joint effort is a result of coordination or of cooperation.

The purpose of organizing is the building of a structure for the exercise of (a) authority in coordination and (b) leadership in cooperation.

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1. Lyndall F. Urwick, "Organization as a Technical Problem," *ibid.*

2. Simon, Administrative Behavior.

Barnard said that the need for a definite system of communication creates the first task of the organizer and is the immediate origin of the structure for coordination.<sup>1/</sup> He also said that the function of the executive is to serve as a channel of communication so far as communications must pass thru central positions.

The form of the structure for coordination, then, depends on the structure for communications. Dale and Urwick pointed out that the structure for communications -- and, in turn, that for coordination -- depends ultimately on techniques of communication.<sup>2/</sup> For example, a communication technique that can make large amounts of information quickly available would permit closer supervision -- less delegation -- than one that could not. The structure for communications and coordination would also depend on the availability and reliability of communications. Thus, if a communications link cannot be depended upon to function when it is needed, the structure for coordination must be designed to function without that link.

Two of the main functions of an executive position in a coordinating structure are (1) to interpret the intention of the group and (2) to set the time for integrated action. This indicates the need for a central clearinghouse for information and the location of this clearinghouse in the executive position. This clearinghouse is given the function of notifying all other positions in time of any information, change in plan or action, and so on that affects them.

Barnard said that, because this central clearinghouse involves the exercise of authority, every communication should be authenticated; i.e.,

- a. The person issuing the communication must be known to occupy the clearinghouse position.
- b. The position must be known to have authority to issue this type of communication.
- c. The communication must be known to be in fact an authorized issuance from that position.

It is this device of the "authenticated" communication that enables a staff to act "for and in the name of" the chief.

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1. Chester J. Barnard, The Functions of the Executive, Harvard University (Cambridge: 1938).
  2. Ernest Dale and Lyndall F. Urwick, Staff in Organization, McGraw Hill, (New York: 1960).

Even if it were not desirable to establish the central clearinghouse for the exercise of authority, it would be desirable for efficiency. Say, for example, that five subordinates reported to one executive. If each could talk to all others, 15 channels would be required -- 10 among the subordinates plus 5 from executive to subordinates. With the executive as a central clearinghouse, only 5 channels are required.

#### DEPARTMENTATION, DECENTRALIZATION, AND DELEGATION

Departmentation is the division and distribution of work. It becomes necessary whenever the work to be done exceeds the capacity of one man because (1) he cannot be in two places at the same time, (2) he cannot do two things at the same time, and (3) he cannot know more than a small fraction of the range of skill and knowledge.<sup>1/</sup> Departmentation is accomplished when the whole of the work is separated into parts and each part is assigned to an individual.

Delegation is the distribution of authority. Departmentation of the work creates a need for coordination and this in turn creates a new kind of work: management -- the direction of the work of others. And whenever the management work exceeds the capacity of one man, it too, must be divided, thus creating the need for a higher level of management. The basic grant of authority is given to the highest level of management. From there it is distributed downward thru the various levels of management and finally to those assigned the tasks in departmentation. This process is known as delegation.

Decentralization is a special kind of delegation -- a granting of the authority to exercise the decision-making function of management. The delegation of authority to perform a task may or may not include the authority to select from alternative methods, times, and so on. Decentralization adds this authority.

Gulick<sup>2/</sup> and, in a slightly different way, Newman, et. al.,<sup>3/</sup> characterize each worker and his position by four characteristics that are found in every task:

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1. Gulick, "Theory of Organization."
  2. Gulick, "Theory of Organization."
  3. William H. Newman, Charles E. Sumner, and E. Kirby Wilson, The Process of Management, Prentice-Hall, (Englewood Cliffs, N.J.: 1967)

- a. purpose: the purpose he serves or the product he produces.
- b. process: his function, skill, knowledge
- c. persons: the group with whom he deals or whom he serves.
- d. place: the geographical location where he works.

Whenever all four of these characteristics are identical for all workers and positions in the group, division of the work is simple. However, whenever any of the four differ among the workers and positions, a decision is required as to which characteristic will be given precedence in the division.

The characteristic to be given precedence must be chosen for each case on the basis of its peculiar circumstances. There are no rules. However Newman et al., suggest some points to consider<sup>1/</sup>

- a. Specialization: by process, skill, etc.
- b. Control: separate checking from activity checked.
- c. Coordination: dissimilar activities under one executive.
- d. Economy: each new unit requires space, supervision, etc.
- e. Human Considerations: traditions, attitudes, availability, etc.

Departmentation by purpose brings together in one large department all whose efforts are directed at supplying a given service -- school, fire, and water departments, for example. Departmentation by process brings together all those using the same skills -- lawyers, engineers, etc. Departmentation by persons brings together all who serve the same clientele or work with the same group, e.g., the Veteran's Administration, or the same set of things, e.g., the US Forest Service. Departmentation by place brings together all who work in a limited area without regard for purpose, process, or persons served in a combined, decentralized department, not in a field office of a department organized on purpose, process, or persons.

Each of the four basic systems of organization is intimately related to the other three and the differentiation is quite artificial. All four elements -- purpose, process, persons, and place -- are found in every task and embodied in every workman. Therefore, when an organization form gives precedence to any one element, the others must be recognized in the secondary and tertiary divisions of the work.

A major purpose of organizing is to achieve coordination of the work,

1. William H. Newman, Charles E. Sumner, and E. Kirby Wilson, The Process of Management, Prentice-Hall, (Englewood Cliffs, N.J.: 1967)

more or less thru exercise of authority and communication. It is to be expected that coordination will be best within a department because authority lies there and communications are structured better. On the other hand, the greatest lack of coordination and danger of friction will occur between departments or where they overlap. The relative need for coordination thus may well be the definitive criterion in selecting the form of departmentation.

### Decentralization

Decentralization is, of itself, neither good nor bad, desirable or undesirable. The decision as to decentralization must be based on whether and how much it will aid in achieving the objectives of the organization. For example, will decentralization aid in or detract from coordination of the work? Will it increase or decrease management costs? Some of the criteria that can be applied are discussed in the following:

1. Coordination: What is the requirement for coordinating the local activity concerned in the decision to be delegated with activities in other localities? If the local activity neither affects nor is affected by activities or conditions outside of the locality, the need for coordination is small. But if it does affect or is affected by them, the need may be large. Delegation of a decision authority below the level at which coordinating authority must be applied would serve to defeat the coordination objective of organizing. It would seem, then, that decentralization of decision authority should not be extended below the coordinating level. This does not mean, of course, that decision authority may not be kept to a higher level.

2. Information: Who has the facts on which to base the decision or can get them most readily? Decisions are made best when the decision-maker has information about the problem, the alternative courses of action, and their likely consequences. The longer the communication channel, the lesser amount of accurate information will be passed. Therefore, the executive closest to the source of the problem - organizationally and geographically -- should have the most and best information about it.

But whether the same executive would have the most and best information

on the possible solutions and their consequences is a different matter. If the solutions to the problem are within the capability of the executive -- with or without specialized advice -- he would have the best information on them. But it may be that this capability exists only at a higher management level.

When the solution information exists at a higher level, a judgement must be formed as to whether it would be preferable (1) to pass the facts about the problem to the higher level and make the decision there or (2) to pass the specialized advice down and make the decision there. Because the problem facts would have to be passed up in either event, the tendency would be to make the decision at the higher level unless there were other, overriding considerations.

3. Capacity: Who has the capacity to make a sound decision? Capacity is used here in two senses: (1) capability, either in the executive or in the executive plus his advisors and (2) work load. Capability here means the ability, knowledge, and experience required to make a judicious choice from the alternatives. Capability is relative to the difficulty and complexity of the problem and its solutions.

Work load, on the other hand, means the amount of other work the executive -- and his staff -- have to do. What anyone can do in a given period is limited. Any attempt to assign to a man a piece of work above that which he can do will tend to assure that not only will that task not be accomplished, but also his other work may not be done.

4. Timing: Must the decision be speedy and on-the-spot? Sometimes -- in a rapidly worsening situation, say -- the decision cannot wait on the niceties of staff studies and the use of specialist advice. In other less urgent situations, the time required to make -- or obtain -- a decision may significantly affect its cost. Extended lines of communication take longer to pass information than do the shorter ones. Therefore, the effect of delay on the effectiveness of the decision must be a consideration in the decision to decentralize.

5. Significance: How many functions are involved or what would be the cost (a) of the decision or (b) of a mistake in the decision? The greater the number of functions involved, the greater would be the complexity and



the greater the requirement for capability. In general, the greater the cost of an error in the decision, the higher the level at which it would be made. On the other hand, the higher the level, the more it will cost to make the decision.

6. Communications: Will communications be available to pass the information or the decision? This consideration applies chiefly to emergency organizations. For them, the nature of the emergency or of the work may preclude communication at the time the decision is required. For this type of work, unreliability of communications may dictate decentralization even though other considerations may indicate the contrary. In non-emergency type endeavors, decentralization may be conditional, i.e., decision authority is delegated when -- and only when -- communication cannot be established.

#### Delegation

Above, delegation was defined as the distribution of authority to perform assigned tasks. It has three essential features:

1. Assignment of Duties. Duties are assigned in two ways: (1) by the job to be done and (2) by the results to be achieved. An assignment may specify either of these and it may also specify both. His duties can be clear to a man only when he knows what activities he must undertake and what missions he must fulfill.

2. Grant of Authority. Despite widely-held opinions to the contrary, delegating authority is not simple. The process of delegating authority can be oversimplified if the limits on delegation are not recognized and observed. Among these limitations are the following:

- a. A superior can delegate to a subordinate only such authority as is within his power to grant.
- b. Management authority is founded in law and in custom.
- c. Authority is essential to the doing of work, but it requires acceptance. The authority to supervise can be effective only so far as it is accepted by the supervised.
- d. Authority is limited not only by the specific grant and by law, custom, and acceptance, but also by the general policies, rules, and procedures of the enterprise within which it is to be exercised.

3. Creation of Obligation. Obligation is an attitude of the worker

towards his work: a moral compulsion felt by a worker to accomplish his assigned duties. It implies an agreement that, by accepting the assignment of duties and grant of authority, the subordinate will do his best to carry out his duties. The dependability of the worker stems from this sense of obligation. A delegation of authority creates an obligation; an obligation cannot be delegated. The supervisor who delegates authority to a subordinate remains obligated himself for performance of the duties.

#### SPAN OF CONTROL

Span of control is a term used in discussions of limits of executive capacity in terms of numbers of subordinates. It is not a precise term: some writers use it to mean "number supervised;" others, to mean "number reporting to" and these terms can differ substantially in meaning. In any event, most writers on organization theory and practice give a great deal of attention to this feature of organization.

The earliest reference used is to General Sir Ian Hamilton who held that the average human brain found its effective scope in handling three to six other brains.<sup>1/</sup> He held also that the smaller the responsibility of the group member, the larger the number in the group might be, and vice versa. This is usually interpreted to mean that 3 would be appropriate at the top of an organization and that the number could increase progressively to 6 at the bottom.

The second reference used most generally is to V. A. Graicunas.<sup>2/</sup> He started with General Hamilton's idea and postulated that it could be explained on the basis of what are now called "interpersonal relationships" in behavioral science. He calculated the minimum and maximum numbers of these relationships within groups. Most writers who use these numbers ignore the minimums and quote the maximums. They note that adding one subordinate more than doubles the number of relationships; e.g., from 100 for a group of 5 (a supervisor and 4 subordinates) to 222 for a group of 6. From this they conclude that 5 or 6 is a reasonable maximum number of subordinates. Graicunas did not draw this conclusion.

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1. Sir Ian Hamilton, The Soul and Body of an Army, Edward Arnold Ltd. (London: 1921)
  2. V. A. Graicunas, "Relationship in Organization," in Luther Gulick and Lyndall F. Urwick, Papers on the Science of Administration, 1937.



Dale surveyed 100 companies to find how many subordinates reported to the president.<sup>1/</sup> He found that the number varied from 1 to 24 with 8 the median. The number tended to be somewhat higher in the larger companies. It seems, then, that the validity of commonly understood rules for span of control -- e.g., one supervisor to not over 5 subordinates -- is largely illusory. They are, at best, hypotheses and their one seemingly factual basis -- Graicunas' numbers -- are not at all what they are taken to be.

Newman et al.,<sup>2/</sup> take what appears to be a reasonable approach. In the first place, they use the term "span of supervision" rather than span of control. Then they say that span of supervision is not specific; i.e., it is generally taken to mean 6 to 8 subordinate to a chief executive and 15 to 20 for first-line supervisors of routine operations. But they suggest that the span to be employed be decided on a case-by-case basis, applying the following considerations and, of course, such others as may appear pertinent:<sup>3/</sup>

1. Available Time: The time that the executive can spend on direct supervision depends on the amount of time he must spend on operations and other administrative duties.

2. Importance of Activities: The more important the activities being supervised and the more costly that mistakes can be, the more attention the supervisor must give to supervision and therefore the fewer subordinates.

3. Variety and Repetitiveness of Activities: The greater the variety in the activities being supervised, the more likely that coordination will require the attention of the supervisor. Therefore, the less varied and more repetitive the supervised activities, the more subordinates can be supervised.

4. Ability of Subordinates: The more able the subordinates, the less advice and assistance they should require of their supervisor.

5. Decentralization: An executive who must make any decisions has less time for supervision and can supervise fewer subordinates.

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1. Ernest Dale, Planning and Developing the Company Organization, American Management Association (New York: 1965).

2. Newman et al., The Process of Management.

3. See also: Gulick, "Notes on the Theory of Organization."

6. Chain of Command: Span of control is related in organization theory to "short chain of command:" the idea that there should be as few levels of management as possible between the supreme authority and the rank-and-file worker. These two ideas tend to be contradictory: the less the span of control, the longer the chain of command and the final solution for span of control will usually involve a compromise between them.

#### STAFF AND SPECIAL STAFF

In discussions of organization theory and practice, "staff" is most commonly found in the term "line and staff" used to describe a form of organization structure. As in most of the concepts discussed in organization theory, the use of both "staff" and "line and staff" has been imprecise and varied.<sup>1/2/</sup>

The concept of "line" is fairly clear and well accepted. Urwick quotes from a General Motors Export Corp., directive

"A line officer exercises authority over all of the body of organization lying beneath him on the chart. . ."

Two concepts of "staff" are generally used:

1. Dale and Urwick said that the purpose of staff is to assist the executive in doing his job, to relieve the overburdensome work load.<sup>2/</sup> As Urwick said, "a staff is something to lean on."<sup>1/</sup>

2. Mooney described the staff function as one employing the universal service of knowledge, i.e., one of advice and counsel.<sup>3/</sup>

The essential difference between the two was brought out by Urwick:

- a. (General) staff officers assist the commander by performing duties pertaining to the functions of command.
- b. Technical and administrative staff officers assist the commander and his (general) staff in an advisory capacity related to their special branches.

Dale and Urwick described these in terms of the peculiar usage of the U.S. Army:

- c. A special staff officer performs a special function ancillary to the work of combat troops, but sometimes he commands specialized combat or service personnel.

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1. Urwick, "Organization as a Technical Problem."

2. Dale and Urwick, Staff in Organization.

3. James D. Mooney and Alan C. Reilly, Onward Industry, Harper (New York and London: 1931).

- d. A general staff officer assists the commander in the exercise of his command. In a division, the general staff is divided, under a Chief of Staff, into four sections: G1, Personnel; G2, Intelligence; G3, Plans; and G4, Logistics; members of the special staff dealing with subjects falling within these groups communicate "thru" the appropriate Assistant Chief of Staff. The principal specialists are not "under" the general staff; they are responsible to and have access to the commander.

Dale and Urwick questioned the use of the term "staff" to refer to a specialist who heads a special function because he promotes his specialty and increases rather than decreases the coordination workload. In other words, they would accept both their concept of assisting the executive in the performance of his executive duties and Mooney's of advice and counsel. But they would reject the use of the term for commanders of special and service personnel.

For the purposes of this discussion, the following will be adopted:

- a. A specialist in charge of a unit performing a specialized or service function will be referred to by a title descriptive of his executive position.
- b. A man who assists an executive in the performance of his supervisory and executive functions will be referred to as "staff."
- c. A man who provides advice and counsel to an executive, his staff, or his subordinates on a subject that requires specialized expertise will be referred to as "special staff."

#### STAFF FUNCTIONS

Because the staff assistant assists the chief in the performance of the chief's duties, his functions must be those of the chief, but not necessarily all of them. Which of the chief's functions the assistant performs depends on the assignments the chief makes.

Worthy of special note are the planning and commanding staff functions. The planning function is troublesome because all activities -- line as well as staff -- involve some planning. Mooney and Reilly thought that the staff should not be specially identified with planning. Urwick disagreed; he thought that they had missed the point that the staff officer plans only with his chief's authority. In the context of this present analysis, (1) the staff performs the analyses and the syntheses of alternatives that the chief would have had to make, (2) the chief selects the course of action, and (3) the staff coordinates the details of the action the chief selected. This fits the concept of a staff

helping the chief with his duties.

Urwick noted that command is the administrative function that seems most difficult for the chief to delegate. But it is logical for the staff to do the detailed work of preparing the formal orders and instructions because of the detailed knowledge they obtained in the planning function. He saw, on the other hand, that the decision function cannot be assigned by the chief to the staff. Despite the emphasis on the investigative and planning aspects of staff work, the chief -- the final authority -- must take the available facts into account. No matter how predigested these facts may be, he must review them, weigh them, and base decisions on them. One of the problems with "completed staff work" is the opportunity for the staff to usurp the decision authority of the chief.

#### Staff Authority

Except as relates to his own assistants, the staff officer exercises no authority, neither his own nor his chief's. A well trained staff officer sees himself not as exercising the commander's authority but as helping all in the command to carry out the commander's intentions. He understands that, if friction is to be avoided, differences must be adjusted before, not after, instructions have been issued. The chief difficulty in understanding the staff principle stems from the failure to understand the special relationship by which the commander retains his full authority and responsibility while delegating much of the detailed administrative work. A good deal of this lack of understanding undoubtedly stems from the staff officer's failure to conduct his duties so as to eliminate friction.

#### Effect of Staff on Span of Control.

By relieving the chief of much of the burden of detailed administrative functions, the staff makes more time available to the chief for the executive functions of supervision. Therefore, the assembly of a competent, well-trained staff can increase the chief's span of control. This was General Eisenhower's method. Of course, the Chief of Staff has to be counted in the span so an apparent increase must be examined carefully to find whether there has been, in fact, a beneficial increase in span of control.

### Special Staff

The special staff officer is advisory to the chief, the staff, and the chief's line subordinates in the field of his expertise. By the definitions used here, he is not in charge of a service unit. Thus the general counsel would be special staff; the controller, if he were in charge of budgeting and accounting, would not. Special staff functions are characterized by a requirement for technical or specialized knowledge of a type not possessed by operating executives. Normally each covers only a minor aspect of the total operating job. And usually, each is in a field in which uniformity -- or at least consistency -- of action in several operating units is essential.

### Special Staff Authority

The special staff officer has no delegated authority. He does, or should, have technical control. Thru this, the line officer is either (1) required by the special staff officer's chief to accept his advice or (2) persuaded to accept it by the special staff officer's influence.

Urwick quoted from a General Motors Export Corp., directive

"...the influence exerted by a staff officer outside his immediate department, is, so far as it is authoritative, an authority of ideas....If the expression...-- "authority of ideas" --means anything at all, it means that the staff executives' plans and recommendations are entitled to the respect and consideration of the line executives..."

### ORGANIZATION STRUCTURE

Gulick defined the theory of organizing as having to do with the structure of coordination imposed on the work-division units of an enterprise.<sup>1/</sup> Barnard said that the need of a definite system of communication creates the first task of the organizer and is the immediate origin of executive organization...<sup>2/</sup> The organizing process has to do with the building of a structure for coordinating the work and for providing the flow of communications necessary for coordination.

Structure in organization is universally related to authority. Mooney and Reilly noted that the supreme authority must rest somewhere and in some form in every organization.<sup>3/</sup> They found it essential to the idea of organization that there must be a formal process through which

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1. Gulick, "Notes on the Theory of Organization," 1937

2. Barnard, The Functions of the Executive, 1938.

3. Mooney and Reilly, Onward Industry, 1931.

coordinating authority could operate from the top throughout all of the organized body.

Four different forms of organization structure in "pure" form have been identified:

1. Line Organization. This is the most elementary form of organization structure. In it, orders travel down from the top in a direct line of authority. Full authority for carrying out orders and for determining how they shall be carried out is placed with the executive who is at the point in the line where they are actually carried out. In industry, this executive is the department, or shop, foreman and he is responsible for everything in his shop: work, tools, schedules, materials, quality, costs, the morale of the workman, and so on.

The effectiveness of this form of structure is limited by the availability of qualified foremen. To be fully effective this foreman would have to be truly a master of all the supervisory trades in addition to being well qualified as a planner, a supply clerk, a methods man, a timekeeper, a teacher, etc.. It is improbable that many foremen ever existed who were so well qualified. What probably happened was: what the foreman could do well was done well; everything else was done poorly or not at all.

2. Functional Organization. Frederick Winslow Taylor<sup>1/</sup> was among the first to recognize the basic problem with the line organization: the all-purpose foreman. He saw the solution in specialization, by which each supervisor had charge of one feature of the work. In other words, the man at the machine, instead of looking to one boss, looked to one man for machine set up, to another for speeds and feeds, to another for supplies, to another for timekeeping, pay, and discipline, and so on. The needed information got directly from the one best qualified to give it directly to the one who needed it. But the worker had eight bosses instead of one and discipline suffered.

While Taylor's functional organization did introduce the necessary element: specialization, it did violence to the basic purpose of organizing: coordination. In place of the one executive who could coordinate

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1. Frederick W. Taylor, Scientific Management, Harper (New York: 1947).



all phases of the work of all the workmen in the shop, he placed eight executives who required another executive level above them to coordinate their work. At the next level above the shop the purely functional organization became too complicated. This form was not widely accepted.

3. Line and Staff Organization. This form might more accurately be called "line and special staff" because the staff people are advisors to the line. Introduction of this form is usually attributed to Harrington Emerson. It was proposed as a means of preserving the specialization of the functional form without degrading the discipline of the line form.

In this form, a special staff provides technical advice to its line supervisor and, if desired, to his line subordinates. The special staff has no authority of its own and exercises none for the chief. If authority is necessary to put the special staff recommendations into effect, it is exercised by the chief. More often than not the special staff gains acceptance of its advice thru influence and persuasion.

This form may have staff elements in addition to special staff. But, as noted above, these staff elements are part of the line. It is the special staff that characterize the line and staff form.

4. Committee Organization. The committee form of organization is supplementary to the other three forms. However, it may be used so extensively in an enterprise as to include a major portion of the structure and thus become the underlying organizing principle. When this happens, standing committees are formed for specific functions and special (ad-hoc) committees to handle matters of a temporary nature.

Dale and Urwick pointed out that all human systems of cooperation -- governmental, business, social, fraternal, etc. -- operate at two levels: (1) the legislative or political level, where decisions are made as to policy -- what is to be done; and (2) the executive level, where the policies laid down at the political level are carried out.<sup>1/</sup> The political activity is "thinking"; the executive activity is "acting." Groups of people can think together quite well. But there are few actions that they can take together conveniently. Committees, then, are more appropriate for the political level than for the executive.

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1. Dale and Urwick, Staff in Organization.

## BUILDING THE ORGANIZATION STRUCTURE

### Objectives

Dale identified as one of the classical "principles" of organizing that the enterprise must have a clearly defined objective and each unit and each position an objective logically related to it so that, if each does his job, the goal of the entire enterprise can be met.<sup>1/</sup> The first step in building the organization structure, then, should be to identify and set down the objectives of the enterprise. From these objectives it will be possible to identify the several "purposes" of the enterprise and the "persons served" that were seen above to be characteristics of the work that can serve as bases for departmentation.

### Function and Process

From the objectives and the purposes it will be possible to identify the functions that must be performed and the processes that must be carried on in performing the functions. This is a prerequisite to consideration of the possible extent of functionalization and specialization. Organizing by function is feasible only to the extent that subordinate objectives can be defined for the functions. In this definition of subordinate objectives, it is highly desirable that the definitions be complete. For example, the objective for the Detroit Fire Department is: "minimize fire losses in Detroit", not simply, "minimize fire losses."<sup>2/</sup>

### Decisions

With the identifications of function and process, it is possible to identify the decisions that must be made to perform the functions and carry on the processes. This requires analysis of the functions and processes. This requires analysis of the functions and processes and also of the environments in which they will be performed and of the events likely to pose requirements for decision.

From these analyses and the identification of decisions will emerge a hierarchy of decisions thru which the organization can attempt to influence the behavior of its members in performing the functions and processes. This hierarchy will -- for the most part -- reflect the means-end chain from activity to objective.

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1. Dale, Management: Theory and Practice.
  2. Simon, Administrative Behavior.



### Division of Work

Most writers on the theory of organizing write of the division of work; Simon wrote of the assignment of decision-making.<sup>1/</sup> These are but two sides of the same coin. Deciding is involved in all doing. But the doing is controlled by the deciding. And it is the purpose of organizing to control the doing so as to obtain efficiency thru coordination.

In reality, the physical work of the process is done at the lowest level: the individual workman. Everyone else in the organization is engaged in the making of decisions or in influencing the decisions of those below them. Therefore, specialization by technology or skill can apply only at the lowest level: welder, draftsman, typist, etc. Apart from that, specialization must apply to decision-making.

Given the processes to be carried on and the hierarchy of decisions to be made, alternative patterns of grouping can be considered. The first consideration is departmentation; i.e., whether to group activities principally by purpose, process, persons, or place. As was seen above, the feasibility of these alternatives is determined by the feasibility of functional objectives. Delegation of work to individuals and positions follows from departmentation. Decentralization -- the delegation of decision authority -- is dependent on a number of considerations. Probably most important of these is communications -- their cost and their reliability. Efficiency is the criterion for choice in all of these organizing decisions as to division of the work.

### Form of Structure

The form of the structure for the organization is dictated almost entirely by the division of work. The exercise of authority inevitably requires a line. Planned (standing) committees are usually found in the legislative part of the organization. The requirement for staff is largely determined by the amount of work to be done by each executive. The requirement for special staff is largely determined by the technical complexity of the work. Therefore, the form of the structure is more derived than decided.

### Staffing

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1. Simon, Administrative Behavior.

After the work has been divided and decisions made as to decentralization, the requirements of the individual positions can be derived and the positions, defined. Then these positions can be filled by finding and hiring people having the qualifications that match the requirements -- in theory but not in practice. People meeting the requirements exactly either do not exist or are not available so those available and best suited are hired.

These people are the ones who will do the work and make the decisions, not the organization chart. So it may be desirable -- or even necessary -- to modify departmentation and decentralization to fit the qualifications and abilities these people bring. All of these new people will require some training, at least in familiarization with the organization and its intended policies and operating practices.

#### ORGANIZATIONAL CHANGE

For a number of reasons -- changing objectives, changing technology, changing personnel, and so on -- an existing organization may no longer function efficiently. When this happens, prudence dictates that the organization be changed to fit the new conditions.

In some ways, the reorganizing process resembles the organizing process. The same definition of objectives and analyses of functions are required. So are the consideration of alternatives and the estimating of comparative efficiencies: in departmentation, delegation, decentralization, and the other characteristics of organizations that offer options.

But the choices are not quite so free in reorganization as in setting up a new organization. A functioning organization exists and this has to be considered in designing the new structure. Some elements of the old organization will most likely survive in the new. But some of the existing elements will likely disappear and it is with these that the problems may occur.

Weber noted the survivability of bureaucracies -- finding them among the hardest to destroy of all social structures.<sup>1/</sup> Many examples can be found, e.g., the World War I War Risk Insurance Corp., existed in 1935 in one supervisor, two file clerks, and rows of file cabinets. And as

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1. Garth and Mills, From Max Weber: Essays in Sociology.

does the bureaucracy as a whole, so also do its parts tend to persist.

One of the principal reasons for the persistence of organization structures is habit. Habit is an important basis for coordination.<sup>1/</sup> Organizations attempt to establish habit patterns in the group by establishing institutional routines and in individuals by training. In this the organization attempts to attain efficiency in decision-making by reducing many decisions to reflex reactions to stimuli rather than conscious choices from alternatives.

It seems that, when reorganization cannot be slow, changes requiring new habits should be kept to a minimum. Formation of these institutional habit patterns fits the normal tendency of people. Man seems to find an economy of effort -- at least, mental effort -- in habit. But habits seem easier to form than to break. When organizational change is slow, time permits the breaking of old habits and the making of new.<sup>2/</sup> The slowness is a recognition of the difficulty. But when organizational change is rapid -- as in the so-called "earthquake" reorganization -- old habits become a serious handicap to efficient functioning.

In a reorganization, existing groups should be continued if feasible. One of the most important sets of habits, is that of the interpersonal relationships among the members of a group who work together. Over time, each member of the group makes the necessary adjustments to subordinate his irritations with the others and thus minimizes the frictions that reduce the efficiency of the group. And each gains assurance in his expectations of what the others will do in any situation.

Newman et al., suggested that flexibility should be built into the organization.<sup>3/</sup> They saw that changing conditions should be predictable with reasonable accuracy. Then, even though future requirements may be uncertain, flexibility could be built into the structure. They saw that enterprises that assigned work simply on the abilities of individuals and their chance free time were usually poorly situated to adapt to changing conditions. The alternative, of course, is competent planning of the organization.

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1. Gulick, "Notes on the Theory of Organization".

2. Newman et al., The Process of Management.

3. Newman et al., The Process of Management.

Possibly the most important -- and certainly, the most predictable -- of changing conditions is changing personnel. Staffing changes when people leave the organization for one reason or another and when they move to other positions within the organization. Dale and Urwick noted that, because war leads to casualties -- i.e., changes in personnel -- military organizations are structures of positions rather than of persons.<sup>1/</sup> Thus duties and authorities are assigned to the position rather than to the man. In organizing, this is somewhat at odds with the preferred practice of fitting duties to capabilities. But this is another of the compromises that are characteristic of the organizing process.

#### CIVIL DEFENSE IN GERMANY

In 1965, McGee found that the German concept of civil defense was founded on two convictions:<sup>2/</sup>

- a. Self protection must be the major element in the protection of the civilian population because (a) outside help, such as rescue, would be delayed too long by debris or fallout and (b) highly-organized activity would be effective only where population was concentrated.
- b. Para-Military units with their own command structure -- and assisted by such volunteer agencies as the Red Cross -- are needed for civil defense emergencies.

Consequently, as shown in Figure 2.1, their local emergency organization has three major parts: the normal city forces, the self-help organization, and the Civil Defense Corps.

The normal city forces -- principally, fire and police -- maintain their normal organization, reporting to the mayor. The Civil Defense Corps also reports to the mayor. The Corps is made up of units specially trained for emergency operations and operates independent of the normal city forces, except as their activities are coordinated by the mayor.

The self-help organization is divided into districts of some 5,000 population, blocks of about 500 population, and areas of about 150 population under a warden. Each district has a small squad -- about 20 -- to aid the blocks with fire fighting, rescue, first-aid, and RADEF as needed.

#### CIVIL DEFENSE IN SWITZERLAND

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1. Dale and Urwick, Staff in Organization.
  2. Arthur A. McGee, Civil Defense in Germany, Stanford Research Institute, (Menlo Park: 1965).

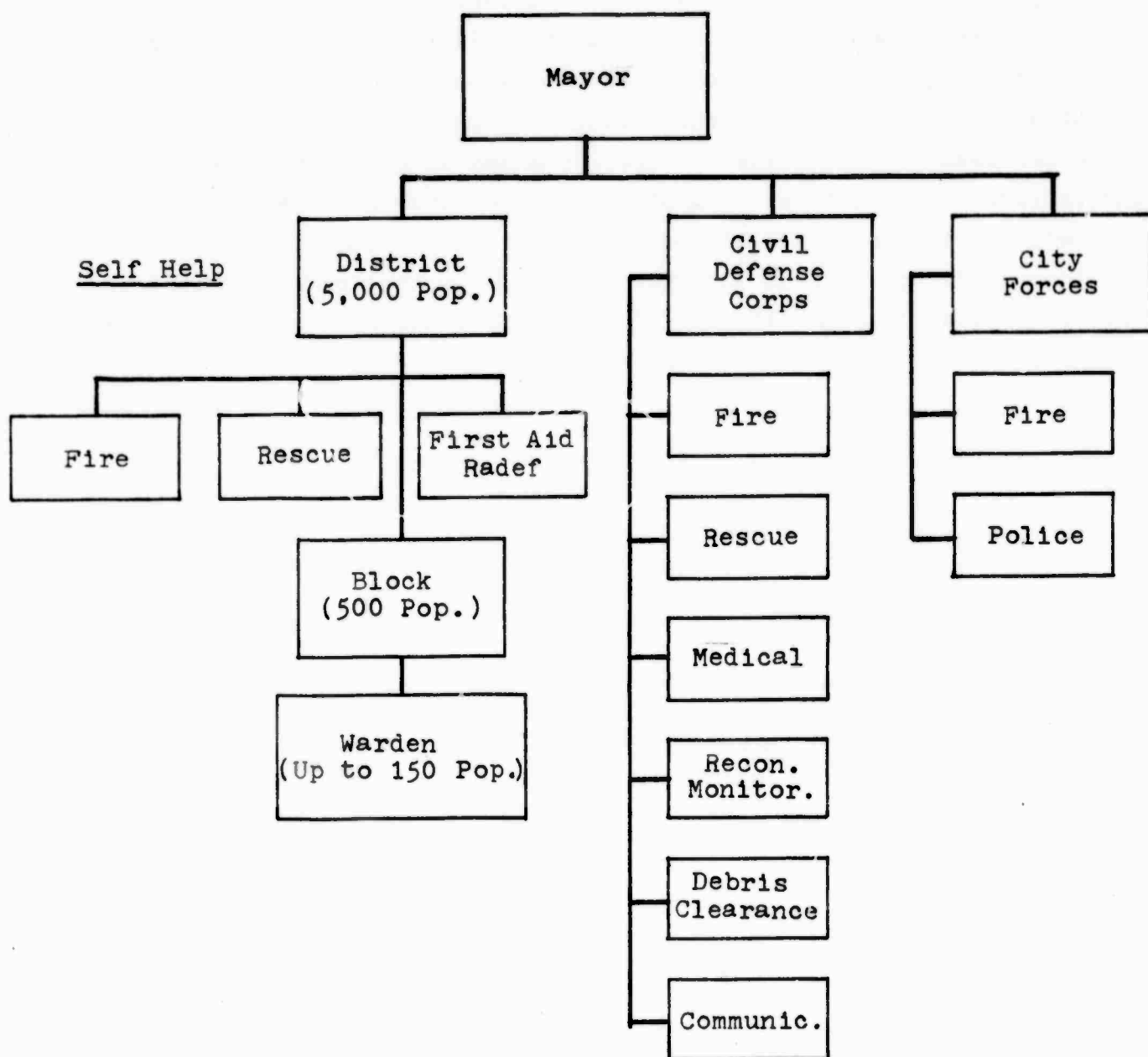


Fig.2.1 LOCAL EMERGENCY ORGANIZATION - GERMANY

In 1965, McGee found that the Swiss organization for civil defense is founded on the philosophy that the self-help forces would do whatever they could and, when they needed help, it would be supplied by civil defense forces under the civil defense director.<sup>1/</sup>

The self-help forces are of two types:

- a. Household, an organization of those able-bodied citizens, not required for the military or specialized civil defense units, whose task is largely fire fighting in their own dwellings.
- b. Industrial and Institutional, organizations for conducting emergency operations in public and private businesses and administrative offices employing more than 100 persons and in hospitals, etc. with more than 50 beds.

The household forces are trained and administered in normal times by the household defense service chief; the institutional forces, by the industrial and institutional service chief. Both of these are members of the staff of the civil defense director. In an emergency, tactical command of both types of self-help forces is exercised thru the household defense organization.

The civil defense forces are organized in tactical groups that are trained and administered by their respective service chiefs in normal times. In an emergency these units report to the civil defense director for deployment but tactical command is exercised by the chief -- sector, district, or block -- to whom they are assigned. The functions performed by the civil defense forces -- and their normal deployment -- are indicated in Figure 2.2. Additional capabilities may be drawn on by the civil defense director from commune police and hospital resources -- these are not in the civil defense organization -- and from the Army. Army units are routinely assigned to larger communes.

#### US MILITARY OPERATING ORGANIZATION

The operating forces are organized in two ways:

- a. Single Service: each of the Services is organized so as to conduct operations in its assigned functions independently of the other services.
- b. Joint Operations: forces of two or more of the Services are organized under a single command for an area, for a given task, and so on.

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1. Arthur A. McGee, Swiss Civil Defense, Stanford Research Institute, (Menlo Park: 1965).

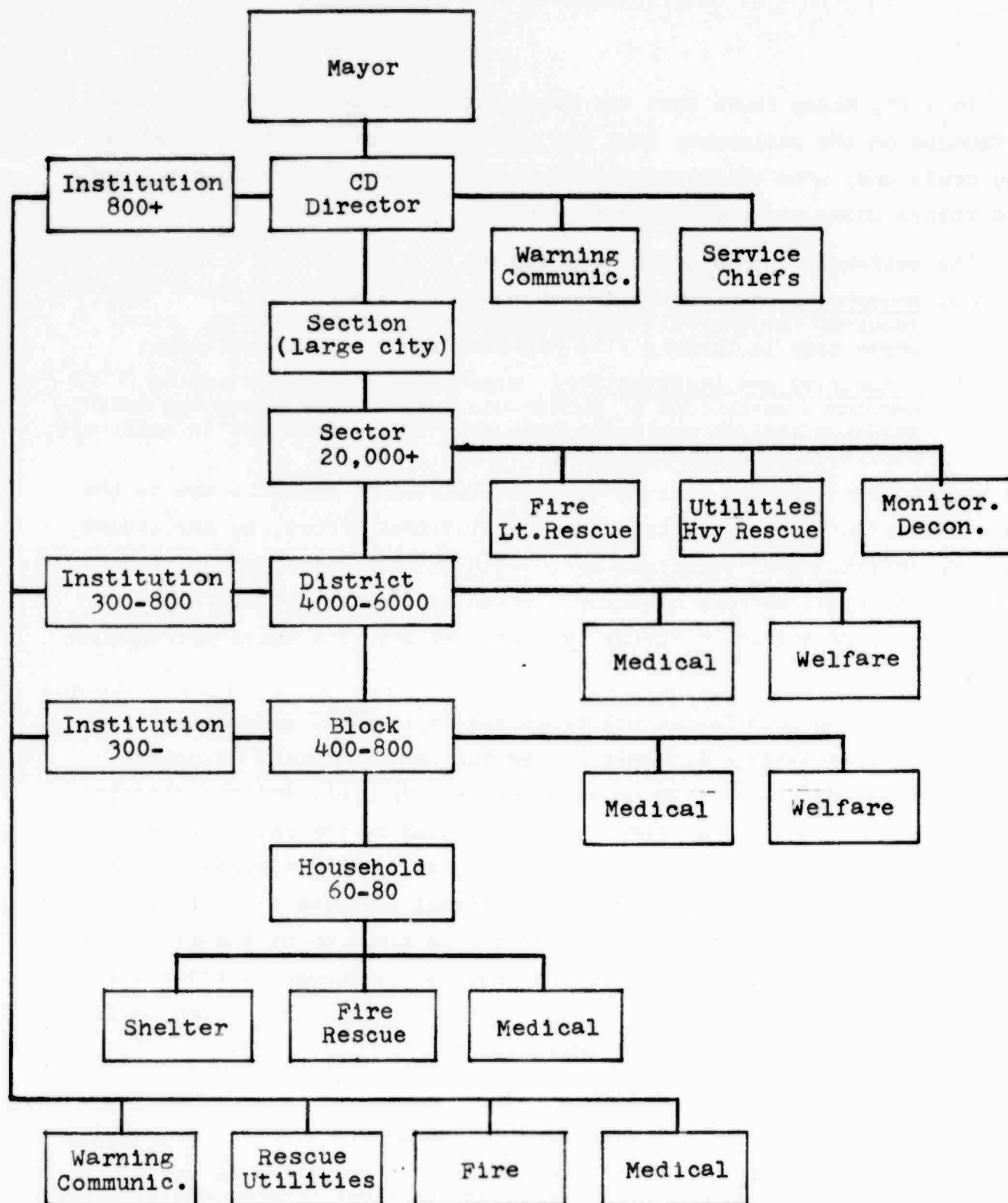


Fig.2.2 LOCAL CD ORGANIZATION - SWITZERLAND



### Single Service Organizations

The three Services are organized in much the same way, although the Navy and Air Force are more flexible than the Army. Each is organized by function at the lower levels, e.g., Army:Infantry, Navy:Destroyer, Air Force:Fighter. At the higher levels, units performing several functions are joined into a single command, e.g., Army:Regiment, Air Force:Group. Each of the Services employs the staff principle, generally in units equivalent to a battalion and larger.

#### Army

The basic unit of organization of the ground field forces in the Army is the Infantry division. In it are brought together the arms and services necessary for maintaining close combat over a considerable period of time and for gaining and holding ground. In addition, the Army employs (a) Armored divisions which emphasize armor more than the Infantry division, and (b) Airborne divisions which differ chiefly in mode of transportation from the Infantry division. The Army also maintains units of arms and services -- artillery, armor, engineer, etc. -- at Corps and higher echelons to be used in conjunction with or in support of the Infantry divisions.

#### Navy

The Operating Forces of the Navy consist of:

- a. The numbered Fleets and seagoing forces not assigned to these Fleets.
- b. Sea Frontier forces, Naval District forces, and other shore activities assigned to the Operating Forces.

The underlying Navy philosophy of organizing for combat appears in the task force concept. A task force is a temporary grouping of units under a single commander for carrying out a specified purpose or mission. The numbers and types of ships -- and ground and air forces -- in a task force, or subordinate task group, depends on the mission to be accomplished. This is the operational command organization of a Fleet.

In addition, the types of ships and units report to a type Commander for administration. This type Commander is responsible for providing personnel and supplies, for basic training, and for the initial conditioning of ships and aircraft. When ships are ready for employment they

are organized into units, e.g., the cruiser-destroyer type command is organized into cruiser divisions, destroyer squadrons, and destroyer divisions. Each of these units may be a separate command and trained as a combat team, but still attached to the type command.

When a unit -- say, a destroyer squadron -- is required for an operational task, it is assigned to the fleet for further assignment to a task force. The squadron commander will then receive operational directives from the task force Commander and administrative instructions -- such as changes in personnel and equipment -- from the Commander cruiser-destroyer force. Upon dissolution of the task force, the destroyer squadron is reassigned to the Commander cruiser-destroyer force.

#### Air Force.

The wing is the major operational unit of the Air Force. It consists of a number of combat squadrons plus a group headquarters when close coordination of the squadrons is required. In addition, the combat wing includes all the required support elements: technical, supply, administrative, medical, and housekeeping.

An air force -- numbered, as in: Eighth Air Force -- directs, coordinates, and controls two or more wings. If close coordination of the operating units is particularly important, an intervening air division is placed between the air force and the wings. Both the air force and the air division are headquarters; i.e., they consist normally of command and staff units only.

#### JOINT OPERATIONS ORGANIZATIONS

For implementing the strategic plans and strategic guidance of the Joint Chiefs of Staff, the operating military forces are organized on two bases:

- a. By Area. An area commander is assigned responsibility for certain continuing operations within a geographic area to be conducted by forces assigned to him.
- b. By Function. A commander is assigned responsibility for certain types of operations and forces without respect to geographical area.

In the area organization, a large geographic area may be assigned to the commander of a JCS-established unified command whose military

operations are expected to be largely independent of other JCS-established commands. Responsibility for smaller areas may be assigned to commanders either subordinate to him or independent of him. Transient forces passing thru his area are not part of his command although they may be subject to his orders for some purposes, such as coordination of defense.

The missions or tasks assigned to a functional commander may require that certain of his installations or activities be partially or wholly exempt from the command authority of an area commander in whose area they are located or within which they operate.

#### Unified Command

A unified command is a joint force having these characteristics:

- a. It has a single commander.
- b. It is composed of significant assigned or attached components of two or more services.
- c. It is constituted and so designated by JCS or by the commander of an existing unified command established by JCS.

The commander of a unified command has a joint staff with appropriate members from each service component under his command in key positions of responsibility. Forces assigned to a unified command normally consist of two or more service components each of which is commanded directly by an officer of that component. These service component commanders communicate directly with their appropriate headquarters on matters not a responsibility of the commander of the unified command. Unless so authorized by the appointing authority, the commander of a unified command does not exercise direct command of any of the service components or of a subordinate force. CINCPAC is a unified command.

#### JCS Specified Command

A JCS specified command is a uni-service command that has a broad, continuing mission and is specified as a command operating under JCS supervision. Although it is usually composed of forces of only one service, it may have units and staff representation from other services. Such an allocation of units of other services does not, of itself, constitute the JCS-specified command as a unified command or a joint task force. SAC is a JCS-specified command with USAF serving as executive agent for JCS.

### Joint Task Force.

A joint task force is one composed of assigned or attached elements of two or more services and which is constituted and so designated by (a) JCS, (b) the commander of a specified command, (c) the commander of a unified command, or (d) the commander of an existing task force. The commander of a joint task force exercises operational control over the entire force and possibly over his own component. Operational control includes the functions of command involving: composition of forces, assignment of tasks, designation of objectives, and authoritative direction necessary to accomplish the mission. It does not include such uni-service matters as administration, discipline, internal organization, and unit training except when a subordinate commander requests assistance.

### III. DEPARTMENTATION

Departmentation is the division of work to improve the productivity of labor and the effectiveness of its management.<sup>1/</sup> Traditionally it has been based on four characteristics found in every task:<sup>2/</sup>

- a. Purpose: the purpose served or the product.
- b. Process: function, skill, knowledge, tools, etc.
- c. Persons: the persons served or dealt with.
- d. Place: the geographic location of the work place.

It is generally thought that one or the other of these must be given precedence in departmentation because they usually apply in differing proportions in the jobs to be done. So it is good practice to examine the several jobs to find which have these characteristics in common to identify groups that seem logical candidates for combining the jobs for supervision. But it seems it should be equally good practice to examine these groupings by characteristic to find whether there may be some over-all grouping that will provide a better basis for assigning the work.

Therefore, the following analysis first examines the similarities among the several emergency operations with respect to their elements separately for purpose, process, persons, and place. Where appropriate, logical groupings are identified for each of the job characteristics. Then, the separate analyses are combined into one in which all four job characteristics are considered jointly and the separate groupings are examined to find whether they then appear logical. (In general, they do.)

#### DEPARTMENTATION BY PURPOSE

In civil defense, the purpose of an operation is described in terms of performance requirements; i.e., problems the operation is intended to solve. These problems are of two general kinds:

1. Attack Effects: these are the problems that are posed by the immediate effects of the attack or of the threat of attack:

- a. Threat: Some civil defense operations that can be performed in response to threat of attack could, of themselves, result in the

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1. Adam Smith, Inquiry into the Nature and Causes of the Wealth of Nations, Random House (New York: 1937)
  2. Gulick, "Theory of Organization"

			PURPOSE																			
			1.Attack Effects									2.Damage										
			1.Threat			2.Direct			3.Indirect			1.People				2.Prop.		3.Syst				
			1.Sheltering	2.Moving	3.Emerg.Sht Dwn	1.Shock & Wind	2.Thermal Pulse	1.Nucl		1.Destruction	2.Missiles	3.Fire	4.Debris	1.Person.Injury	2.Radiation	3.Displacement	4.Entrapment	1.Destr	2.Denial	1.Design Capab.	2.Real Capab.	3.Damag.Capab.
								1.Initial	3.Rad.													
CD Operating System - Functions	1.Sheltering	1.Shielding																				
		2.Control Environ.																				
		3.Provide Utilities																				
		4.Medical Care																				
		5.Maintain Health																				
		6.Fire Fighting																				
		7.Maint.Law& Ord.																				
		8.Feeding																				
		9.Decontam.																				
	2.Warning	1.Alerting																				
		2.Informing																				
	3.Moving	1.Strategic																				
		2.Tactical																				
		3.Remedial																				
	4.Rescuing																					
5. Maintain Health	1.Sanitation																					
	2.Contr.Disease																					
	3.Contr.Vectors																					
6. Fire Fighting	1.Prevent																					
	2.Suppressing																					
7. Maintain Law & Order	1.Suppress.Crime																					
	2.Maint.Order																					
8.Protecting Livestock																						
9.Emergency Shut Down																						
10. Medical Care	1.Collecting																					
	2.Treating																					
11.Feeding																						
12.Housing																						
13. Restoring Facilities	1.Clearing Debris																					
	2.Repair.& Replac.																					
14. Decontam.	1.Facilities																					
	2.Terrain																					
15.Welfare Services																						

Fig.3.1 PURPOSE OF OPERATIONS

equivalent to some kinds of damage. For example, completely evacuating a target too early in a crisis, keeping people in shelter after they could safely leave, or failing to move them back to their homes when it could be done would produce the same adverse effects of displacement as would attack-caused damage.

- b. Direct: some civil defense operations are intended to prevent damage to people or property by the products of a weapon detonation: shock and wind, thermal pulse, and initial and residual nuclear radiations.
- c. Indirect: other civil defense operations are intended to prevent damage to people or property by secondary results of a weapon detonation: destruction, missiles, fire, and debris.

2. Damage: these are problems that result from the attack effects:

- a. People: personal injury (pain and suffering), radiation (long-term damage), displacement (restriction on activity), and entrapment in a hazardous location.
- b. Property: destruction (loss and cost of repair or replacement) and denial (temporary loss of use.)
- c. System: inability of the system to apply its potential capability because
  - (1) it is not fully ready to operate in the environment for which it was designed,
  - (2) the environment is different from the one for which it was designed, or
  - (3) the system has been damaged.

To examine how the consideration of departmentation by purpose applies to civil defense operations it is necessary to compare the work that can be done by each of the operations to that needed to solve each of the problems. When the two match, for any operation/performance requirement pair, that operation is identified as having the purpose described by that performance requirement.

For this examination it is useful to employ an analytical device called a matrix as shown in Figure 3.1. Here the rows represent the operating functions and the columns represent the performance requirements. Each cell -- intersection of a row with a column -- contains the implied question, "Does this operation serve this performance requirement?" A mark in a cell says that the answer is "yes." A blank says that the answer is "No."



Then, referring to Figure 3.1, it can be seen that the shielding function of sheltering -- i.e., how the shelter structure protects the people -- serves to solve

- (a) the threat problem; it does this by the way it is used: people do not go to shelters until the need is seen and they leave when the need has passed;
- (b) the problems posed by the direct attack effects and missiles: it does this by interposing a massive barrier between the effects and the people; and
- (c) the insufficient readiness problem; it does this, for example, by
  - (1) designed capability: making last minute expedient improvements such as adding shielding when the plan called for it,
  - (2) real capability: crowding people into spaces with the best protection factors when the actual dose rate is higher than was expected; or
  - (3) damaged capability: repairing damage to shelter doors.

Similarly, Figure 3.1 shows that the suppressing function of fire fighting serves to solve

- (a) the indirect fire problem: it does this by extinguishing the fires;
- (b) the problems of property damage and denial: it does this again by extinguishing the fires and as a result preventing damage and denial;
- (c) the insufficient readiness problems: it does this, for example by
  - (1) designed capability: calling up the auxilliary fire fighters and moving the fire companies to their planned locations in the crisis period;
  - (2) real capability: relocating fire companies to where the need is greatest when fires are burning -- the "support" operation;
  - (3) damaged capability: replacing injured firefighters by untrained people to perform tasks for which special training is not needed.

#### DEPARTMENTATION BY PROCESS

Departmentation by process brings together those operations that

involve the same kind of process. Process has four elements:

- a. Personnel: those who do and manage the work.
- b. Equipment: the tools and mobile machines required.
- c. Supplies: the materials used.
- d. Facilities: the structures used with their installed machines and devices.

For analyzing the application of departmentation by process to civil defense operations the following characteristics of the four process elements seem useful to consider:

1. Personnel: the skill requirement for the tasks to be performed, e.g., professional and administrative vs. trades. In addition, it may prove helpful to identify special skill requirements that are peculiar to the operation both with respect to other operations and to the same operation under other conditions.
2. Equipment: type, e.g., motor vehicles and construction equipment. Some equipment -- e.g., fire engines -- are built specially for the operation. In addition, special stationary equipment can be identified by noting "special" without either "vehicle" or "construction."
3. Supplies: Tools are closely related to skill and may be ignored. The major supply requirements for the operation, e.g., Medical Care requires medical supplies, Feeding requires food and water, and so on. All operations using vehicles or construction equipment require fuel among the miscellaneous supplies.
4. Facilities: type of operation conducted in them. For this it has been taken that motor and equipment pools would be operated from a Multipurpose Staging Area (MSA). For this reason, all operations requiring vehicles or construction equipment -- except medical operations -- have been taken as using the MSA.

However, for this present analysis, supplies need not be considered because they are customarily handled in wide variety. And facilities need not be considered because they can usually be adapted to a wide variety of operations. Therefore, the analysis considers only people and equipment. The complete analysis is shown in Figure 8.1.

Classification of Functions by Equipment Used												
None		Vehicle		Construct		Special						
Classification of Functions by Personnel Skills	Professional	Technical	Sp Skill	1.1	6.1.1.2 6.1.2.1 ①		13.2 14.1 14.2 ②	13.2 14.1 14.2	5.1.1 5.1.2 ③	6.1.1.1		
			No Sp Sk		K1.4 9							
		Administrative	Sp Skill	1.1	11.1	2.1 2.2 ④				2.1 ④		
			No Sp Sk	1.8	11.2	15	5.2.2					
				12.1 12.2	K1.3.2 K1.3.4	K1.3.2 K1.3.4 ⑥						
	Medical		1.4 1.5	⑤	5.2.3 10.2.2.2 ⑩	5.2.1 10.2.2.1 10.2.1 ⑪						
	Trades	Skilled	Sp Skill	1.5 1.6 1.7	11.1		4 7.1 7.2 ⑧	6.1.2.2 6.2.2 ⑦	13.2 14.1 14.2	13.2 14.1 14.2	4 5.1.1 5.1.2 ③	6.1.2.2 6.2.2 ⑦
			No Sp Sk	1.3	11.2	K1.4	5.3	3 ⑨	13.1 ②	5.3		
		Unskil		1.5 1.8 1.9	11.2	K1.4	K1.3.2	5.3	13.1 13.2 14.1 14.2	13.1 13.2 14.1 14.2	5.3	
			6.1.1.2 6.1.2.1 ①	9	K1.3.2	10.1						
			6.1.1.2 6.1.2.1 ①		6.2.1	5.1.3						

Fig.3.2 OPERATIONS GROUPED BY PROCESS

Here, again, the matrix is a useful device for making, and recording the results of, the analysis. In Figure 3.2, the rows represent the classes of people employed in an operation; the columns, the classes of equipment. Here, each cell asks the question, "Which operations employ this class of people and this class of equipment?" Entries in the cells are the codes for the operations that fit these criteria. The operations represented by the codes are identified in the discussion that follows.

#### Groups of Operations by Process

When two or more operations fall into the same cell in Figure 3.2, they have similar requirements for equipment and personnel. Then these operations are logical candidates for grouping for supervision. A number of such groupings can be found in Figure 3.2. They have been enclosed in heavy lines and given a number in a circle. Why these groups are logical and why other operations do not fall into groups are discussed below.

#### Group 1: F6.1.1.2 Fire Fighting/Passive Screening F6.1.2.1 Fire Fighting/Passive Inhibiting

In the first instance, at the top of Figure 3.2, these are "office" jobs involving technical professionals in advising on passive screening and inhibiting. In the second, (at the bottom of Figure 3.2) the doing of the work of passive screening would be performed by unskilled workers using the advice received from the professionals.

#### Group 2: F 13.1 Clearing Debris F 13.2 Repairing & Replacing F 14.1 Decontaminating Facilities F 14.2 Decontaminating Terrain.

These operations require technical professionals and skilled and unskilled tradesmen. They use both vehicles and construction equipment although not necessarily in all of their operations. F 13.1, Clearing Debris, differs somewhat in its requirements but the similarities are sufficient to include it here.

#### Group 3: F 5.1.1 Operating Water Treatment Plant F 5.1.2 Operating Sewage Treatment Plant.

These operations require technical and skilled trades personnel with closely related skills and use similar fixed special equipment.

Group 4: F 2.1 Warning/Alerting  
F 2.2 Warning/Informing.

These are two parts of the warning operation. They require administrative personnel and involve the exercise of authority. Here, again, the fixed special equipment used for alerting is remotely operated from an office.

Group 5: F 11.1 Preparing & Serving Food  
F 11.2 Distributing Food  
F 12.1 Billeting  
F 12.2 Community Lodging  
F 15 Welfare Services

These operations are primarily administrative although F 11.1, Preparing & Serving Food, does involve operation of a "restaurant."

Group 6: K 1.3.2 Supplying Resources/Supplies  
K 1.3.3 Supplying Resources/Transport  
K 1.3.4 Supplying Resources/Control

These operations have a major administration job in common. K 1.3.2, Supply, administers warehousing, issuing, and delivering of supplies; K 1.3.3, Transport, administers a motor pool and trucking service; and K 1.3.4, Control, administers the allocation of supplies and possibly of manpower and transport. K 1.3.2, Supply, and K 1.3.3, Transport, have in common a major requirement for operating transport.

Group 7: F 6.1.2.2 Fire Fighting/Active Inhibiting  
F 6.2.2 Fire Fighting/Fighting Fire.

These operations are much the same except that F 6.1.2.2, Active Inhibiting, is applied to facilities that are not burning while F 6.2.2, Fighting Fire, is applied to those that are on fire. They require similar personnel and special-purpose equipment.

Group 8: F 7.1 Suppressing Crime  
F 7.2 Maintaining Order.

These operations require similar skills and both use vehicles.

Group 9: F 3. Moving  
F 10.1 Medical/Collecting.

These operations are similar except that F 3, Moving, serves well people while F 10.1, Collecting, serves the ill and injured.

Group 10: F 5.2.3 Isolating  
F 10.2.2.2 Facility Care.

F 5.2.3, Isolating, is a particular kind of F 10.2.2.2, Facility Care,

in which cases of communicable disease are isolated.

Group 11: F 5.2.1 Innoculating  
F 10.2.1 First Aid  
F 10.2.2.1 Home Care.

These operations all require medical skills and use vehicles.

#### Operations not Grouped

F1. Sheltering: Although most of the subordinate operations of F 1, Sheltering, have characteristics in common with others, they have not been included in other groups because of the particular condition that restricts their conduct to the shelters.

F 4. Rescuing: This operation uses vehicles and construction equipment in common with other operations but the special skill it requires seems sufficient to let it stand alone at the working level.

F 5.1.3 Disposing of Trash: This operation has similarities to others, for example, to F 13.1, Clearing Debris. However F 13.1 uses construction equipment and this difference seems sufficient for not grouping them here.

F 5.2.2 Quarantining: This operation requires administrative skill and uses vehicles as do other functions but the skill required differs from, say, K 1.3.2, Supply.

F 5.3 Controlling Vectors: Some of the work of this operation -- mosquito control, for example, uses construction equipment. All of the work uses vehicles. However, the differences seem to outweigh the similarities at the working level.

F 6.1.1.1 Fire Fighting/Active Screening: This operation differs from the other fire fighting operations. It is associated with warning in the time and place of its functioning but screening requires a different, highly-technical skill.

F 6.2.1 Fire Fighting/Fire Watch: This operation uses vehicles and employs unskilled labor as does, for example, F 5.1.3, Disposing of Trash. However, the differences again outweigh the similarities.

F 8. Protecting Livestock and F 9. Emergency Shut Down are clearly different from the others and from each other.

K 1.1 Assigning Authority: This is an administrative operation that does

not have significant similarity to others considered here.

K 1.2 Staffing: This operation is included in all of the others.

K 1.3.1 Supplying Support: This operation is different from the others; it is primarily a way of assigning jobs to units that perform the other operations.

K 1.4. Establishing Facilities: This operation involves the setting up and operating of facilities to serve other operations, but it differs from the operations it serves.

#### DEPARTMENTATION BY PERSONS

Departmentation by persons brings together those systems operations that serve the same clientele. For the study of organizing civil defense operations, people can be divided in several ways. The following seem to be the more significant classification schemes.

1. Relation to System. In relation to the system, there are two kinds of people: (1) those who operate the system and (2) those served by it. But civil defense also serves those who operate the system. So this classification scheme may be subsumed in the others.

2. Location. Several locations of people are significant for consideration in organizing civil defense. These classes are mutually exclusive; i.e., a person may be in only one class of location at a time. The following are the significant types of locations:

- a. Normal: This is the normal day-to-day distribution of the public -- varying throughout the 24 hours -- in which the public would be when they were first brought into the system by a strategic movement or a tactical movement to shelter.
- b. Moving: This is the location of people in the open when moving as a system operation: strategic, tactical, or remedial.
- c. In Protection: This is the location of people in protecting spaces -- community shelter, home basements, and in refuge. It also includes those caught in the open without protection but not moving in a system operation.
- d. In Homes: This is the location of people in homes but not in



protecting spaces such as basements. Some of these people would be in their own homes; the remainder would be billeted in the homes of others.

- e. In Facilities: This is the location of people in community lodging dormitories, in hospitals, and in other such places for community dwelling.

3. Condition: Essentially, only two conditions of people are significant for civil defense operations: (a) those who are ill or injured and (b) those who are not. However, most civil defense operations serve both classes and, in addition, some difference can be made between those ill and those injured. Therefore, four classes by condition are significant: (1) all, (2) well and able, (3) ill, and (4) injured.

Analysis of the application of departmentation by persons to civil defense operations requires identification of which operations serve which persons. A detailed recording of such an analysis is shown in Figure 8.2. A summary of the analysis is shown in Figure 3.3. In this the rows represent people classified by location; the columns, those classified by condition. Each cell asks the question, "which operations serve these people in this location?"

Some operations serve people in more than one location. This is shown in locations 4, 5, and 6. For example, location 5 includes the people who are in both locations 2 and 3, that is, those in protection and those in homes and facilities.

#### DEPARTMENTATION BY PLACE

Place concerns the location of (a) the purposes to be achieved, (b) the people to be served, and (c) the operations to be performed. Consideration of place was inherent in the consideration of departmentation of operations by purpose; the location of the problem dictates the place of the purpose. Consideration of departmentation by persons was based on their location. In the consideration of departmentation by process, place was related to facilities but this was excluded from the analysis. Therefore, it remains necessary to examine departmentation by place as it relates to process.

		People Grouped by Condition		
		1. All	2. Well and Able	3. Ill and Injured
People Grouped by Location	1. Norm. Dist. 1. Mov. to Shelter	F2 Warning F6.1.1.2 Pass. Scr. F6.1.2.1 Pass. Inhib. F8 Prot. Livestock F9 Emerg. Shut Down	F3.1 Strat. Moving F3.2 Tact. Moving	
	2. Protect In	F1 Sheltering F4 Rescuing F6.2.1 Fire Watching		F10.2.1 First Aid
	3. In Housing In Facilities	F5.1.3 Disp. Trash F5.3 Contr. Vectors F11 Feeding F12 Housing F13 Restor. Facil. F15 Welfare Serv.		F5.2.1 Innoculating F5.2.2 Quarantining F5.2.3 Isolating F10.2.2.1 Home Care F10.2.2.2 Facil. Care
	4. (1+2)	F6.1.1.1 Act. Scrm.		
	5. (2+3)	F5.1.1 Op. Water Plnt F5.1.2 Op. Sew. Plant F6.1.2.2 Act. Inhib. F6.2.2 Fight. Fire F14 Decontamination	F3.3 Remed. Mov'g	
	6. (1+2+3)	F7.1 Suppr. Crime F7.2 Maint. Order		F10.1 Medic/Collect.

Fig. 3.3 OPERATIONS GROUPED BY PERSONS

Operations can be characterized in relation to place in two ways:

1. By the way workers go to the work place:
  - a. Point Operations: the workers go directly to the work place and perform their tasks there.
  - b. Area Operation: the workers go first to an assembly place and from there, as the need arises, to a work place anywhere within a defined area.
2. By the extent of the area served by the smallest functioning group when it performs its tasks:
  - a. Metro: The entire metropolitan area consisting of one or more operating zones.
  - b. Zone: The whole operating zone.
  - c. Section: A defined subdivision of an operating zone.
  - d. Site: The immediate area of the work place.

The significance of the point vs. area characterization lies in the requirement for site condition information for operating:

1. Point Operation. Assume that, in the situations in which the system would operate, workers in a point operation would be quartered close enough to the operation that travel from quarters to work would not pose a significant problem. Then the site condition information requirement is limited to that for the immediate area of the operation. This information can be acquired by the workers -- provided that the required skills are included in the staffing.

2. Area Operation. Assume, similarly, that here the workers are quartered close to the assembly place. Then the site condition information requirement is that for:

- a. the immediate area of the assembly place,
- b. the route from the assembly place to the work place, and
- c. the immediate area of the work place.

And, because the work place may be anywhere within a defined area, this requirement adds up to that for the whole defined area. For the assembly and work places, the requirement is the same as for a point operation and the information can be acquired by those waiting or working there. But for routes and prospective work places, the information is needed before the workers leave the assembly place. This seems to point to a

		Area Served			
		Site	Section	Zone	Metro
Type of Operation	Point	F1			F2
			F5.2.3 F10.2.2.2	F5.2.3 F10.2.2.2	F5.2.3 F10.2.2.2
					F5.1.1 F5.1.2
		F6.1.1.2 F6.1.2.1			F6.1.1.1 F6.1.1.2 F6.1.2.1
		F8 F9			
		F11.1 F12.2	F11.2 F12.1 F15		
			K1.1	K1.1	K1.1
		K1.2	K1.2	K1.2	K1.2
	Area		K1.3.4	K1.3.4	K1.3.4
		K1.4	K1.4	K1.4	K1.4
			F3 F4 F5.1.3 F5.2.1 F5.2.2 F5.3 F6.1.2.2 F6.2.1 F6.2.2 F7 F10.1 F10.2.1 F10.2.2.1 F13 F14		
			K1.3.1	K1.3.1	K1.3.1
			K1.3.2	K1.3.2	K1.3.2
			K1.3.3		

Fig.3.4 GROUPING OF OPERATIONS BY PLACE

need for assembling area-wide site condition information at the assembly place. The logical source of this information is a unit from the assembly place. The logical source of this information is a unit from the assembly place that either brings back or sends back its observations.

The significance of the "area served" categorization lies in the amount of independence the smallest operating unit can have. This depends largely on the need for coordination

- a. of the activities of the smallest unit with those of others performing the same operation in other areas, and
- b. of the activities of the smallest unit with those of others performing different operations in the same area.

Whenever the need for coordination is as in a, departmentation by process would seem to take precedence. Whenever the need is as in b, departmentation by place would seem preferable.

Analysis of the application of departmentation by place requires an examination of operation type and the area served by each. The complete analysis is shown in Figure 8.3. The analysis has been summarized in Figure 3.4. Here the operations are listed by type of operation and by area served. It will be noted in Figure 3.4 that some operations are shown serving more than one kind of area. In the case of F 10.2.2.2, Facility Care, this indicates uncertainty at this point in the analysis as to what areas these facilities would, in fact, serve. In the case of F 6.1.1.2, Passive Screening, it indicates that this operation can be further subdivided with one part performed at the site, the other at metro. To be most useful, the analysis should reflect all the possibilities at this point.

#### DEPARTMENTATION OF OPERATIONS BY ALL JOB CHARACTERISTICS

At the beginning of this chapter it was noted that there might be some circumstances in which operations could be grouped by two, three, or all four job characteristics. To find whether this is so for civil defense emergency operations the groupings of operations by process, persons, and place as shown in Figures 3.2, 3.3, and 3.4 have been combined in Figure 3.5. The groupings by process from Figure 3.2 have been enclosed in heavy lines and given the same identifying numbers in the circles. The groupings by persons from Figure 3.3 are shown in the

Departmentation of Operations by Place							
Point Operations				Area Operations			
Site	Section	Zone	Metro	Section	Zone	Metro	
Norm.Dist 1. MovtoShelt	(1) F6.1.1.2 F6.1.2.1		F2 (4) F6.1.1.2 F6.1.2.1	F3.1 F3.2 F10.1 (9)			
	F8		(1) F6.1.1.1	F7.1 F7.2 (8)			
	F9						
	F1		F5.1.1 F5.1.2 F6.1.1.1	F3.3 F10.1 (9) F4 F6.2.1 F6.1.2.2 F6.2.2 (7) F7.1 F7.2 (8) F10.2.1 (11) F14.1 (2)			
2. In Protection							
3. In Housing 3. In Facilities	F11.1 F12.2 (5) F15	F11.2 F12.1 F15	F5.1.1 F5.1.2 (3)	F3.3 F10.1 (9) F5.1.3			
		F5.2.3 F10.2.2.2	F5.2.3 (10) F5.2.3 F10.2.2.2	F5.2.1 (11) F10.2.2.1			
				F5.2.2 F5.3 F7.1 F7.2 (8) F6.1.2.2 F6.2.2 (7) F13.1 F13.2 F14.1 F14.2 (2)			
Internal System Operations	K1.1	K1.1	K1.1	K1.3.2	K1.3.2	K1.3.2	
	K1.2	K1.2	K1.2	K1.3.3			
		K1.3.1	K1.3.1				
		K1.3.4	K1.3.4				
	K1.4	K1.4	K1.4				

Fig.3.5 GROUPING OF OPERATIONS BY ALL CHARACTERISTICS

rows. To them are added the internal operations of K 1, Organizing that serve other system operations rather than serving people directly. This grouping implicitly serves as a grouping by purpose because of the way it was derived. The groupings by place from Figure 3.4 are shown in the columns.

As seen in Figure 3.5 the groupings by process originally derived in Figure 3.2 survive well; i.e., only one of the groups was split when the different groupings were combined. In Group No. 11, F 10.2.1, First Aid, does not serve people who are similarly located to those served by the other operations in the group. This does not mean that this group should be changed at this point. However, it does indicate that these operations should be given further consideration in subsequent analyses.

Therefore, it appears that grouping of civil defense emergency operations by process also serves the other job elements -- purpose, people, and place -- and would be satisfactory for use in considering assignments to services.

#### ESTABLISHING SERVICE GROUPINGS

A service is an element of an organization set up to perform a number of assigned operations. It is distinguished from other kinds of organization elements in that the service can be identified as performing those operations throughout the organization even though a piece of it is included in the other kinds of organization elements. The service can be established -- or described -- generally on the bases of (1) the special skills it requires, (2) the work it does, or (3) both.

#### Technical Operations

In civil defense, three "technical" services are salient:

1. Fire: fire prevention and suppression are common operations provided by society and organizations having the special skills required for performing these functions are found in most areas of general political jurisdiction: towns, cities, and counties.

2. Police: Suppression of crime and maintenance of order are also common operations of society and organizations having the special skills required for performing them are found in most governments having general political jurisdiction.



3. Medical: Providing medical care and some aspects of maintaining health involve special skills of such significance that governments generally maintain jurisdiction over the qualifications of those permitted to perform these operations. Contrary to the fire and police practice, health and medical services are not performed by comprehensive organizations. Some services are provided by government; some, by private organizations; some, by individuals. However, there is much informal integration. For example, one doctor may practice in the patient's home, in his own office or clinic, in a private hospital, and in a government hospital. Thus, even though the practice of medicine is not usually conducted by comprehensive formal organizations, the commonality of special skills and work done and the existence of a pervasive informal organization indicate the desirability of identifying a medical service.

The civil defense operations that seem to be "natural" assignments to these three services are shown in Figure 3.10. These are the operations that directly employ the special skills that define the services.

		Suitable Operations	
		Point Operations	Area Operations
Service	Fire	F6.1.1.1 Active Screening F6.1.1.2 Passive Screening F6.1.2.1 Passive Inhibit	F6.1.2.2 Active Inhibiting F6.2.2 Fighting Fire
	Police		F7.1 Suppressing Crime F7.2 Maintaining Order
	Medical	F5.2.3 Isolating F10.2.2.2 Facility Care	F5.2.1 Innoculating F10.2.1 First Aid F10.2.2.1 Home Care

Fig.3.6 ASSIGNMENTS TO SERVICES

### Shelter Operations

It is possible that loss of access and communications would require each shelter to operate as a microcosm of civil defense with respect to the operations to be performed within it. Thus, it seems desirable to identify -- at least tentatively -- a shelter service to perform the one operation: F 1, Sheltering.

### Resource Operations

Many governments have found it desirable to establish organizations to handle the supply of resources that are required more or less in common by their other elements. The General Services Administration and the Defense Supply Service are examples. These organizations generally provide such services as:

- a. Purchase, storage, and distribution of supplies;
- b. Construction, maintenance, and operation of buildings;
- c. Contracting for services; and
- d. Procurement, maintenance, and operation of transport.

Such organizations are established chiefly to achieve efficiency in procurement, in operation and management, and in consumption. It seems that the necessity for efficiency in civil defense operations should indicate the desirability of establishing a resource service. Initially, the suitable functions for this service are:

- K 1.3.2 Supplying Supplies
- K 1.3.3 Supplying Transport
- K 1.4 Establishing Facilities.

But resource has a wider connotation for civil defense operations than for normal government operations. For example, day-to-day fire fighting uses the streets to provide access to the fire. This is but a tiny part of the use of the streets; the private pursuits of the people are the major part. But in some civil defense emergency situations, the use of the streets for fire fighting could be their principal use. In this case, streets must be counted a civil defense resource. Operations performed to make them available would be similar to K 1.4, Establishing Facilities, and would be logical candidates for assignment to the resource service. The same kind of analysis applies to other types of facilities. The functions suitable for assignment to the

resource service on this basis are:

- F 13.1 Clearing Debris.
- F 13.2 Repairing and Replacing.
- F 14.1 Decontaminating Facilities.

Other areas not normally thought of as "facilities" might be required for civil defense operations. For example, an athletic field might be usable for a motor park or a tent camp. And it might be that such an area would be contaminated by radioactive materials. In addition, the presence of radio-active materials on terrain in the vicinity of facilities would restrict their use. Then F 14.2, Decontaminating Terrain, would be suitable for assignment to the resource service.

#### Welfare Operations

One other group of operations seems logical to assign to a service:

- F 11.1 Preparing and Serving Food
- F 11.2 Distributing Food
- F 12.1 Billeting
- F 12.2 Community Lodging
- F 15. Welfare Services

These all serve the people directly to sustain them by providing for their essential needs: food and housing, and their desirable needs: clothing, counseling, information about relatives and friends, and so on. These operations would be suitable for assignment -- tentatively -- to a welfare service.

#### Remaining Operations

The remaining operations shown in Figure 3.9 do not relate to those assigned above on the bases on which those were assigned. These remaining operations will be considered individually.

##### 1. Functions Relating to People.

F 2. Warning. This is a point operation serving the metro area and it involves an exercise of authority at the metro level. This renders warning different from all other operations. It seems most logical to assign it to metro headquarters but not to any of the identified services.

F 3. Moving.

F 10.1 Medical Care/Collecting. In one way, moving is peculiar to civil defense because (1) it is so large an operation -- strategic and

tactical -- or (2) it involves almost complete management by the government -- remedial. But in another way, moving is a normal event; fairly large movements of people occur twice each work day, for example. Day-to-day moving and civil defense moving have one feature in common: control of the flow of the movement. This is normally provided by the police service and it is included in the function, F 7.2, Maintaining Order. Therefore, it seems logical to assign F 3, Moving, to the police service and not to establish a separate service for it.

Moving of the ill and injured -- ambulance service -- is a day-to-day function of society. It is provided in several ways: by private organizations and by fire or police organizations. In civil defense operations, moving patients is closely related to moving well people; the two operations often are performed in the same place at the same time. Therefore, it seems logical to assign F 10.1, Medical Care/Collecting, to the police service along with F 3, Moving.

F 4. Rescuing. Rescue operations are normally performed by fire departments largely because the need for rescue is often associated with fire or because the rescue requires ladder equipment of the type used by fire fighters. These kinds of rescue operations resemble the civil defense "light rescue" operation. The day-to-day equivalent of the civil defense "heavy rescue" -- usually requiring the use of construction equipment -- is normally performed by ad-hoc groups. In civil defense emergency operations, rescuing would usually be conducted in close cooperation with F 3.3, Remedial Moving, and F 10.1, Medical/Collecting. In addition, it is likely that, when rescuing is needed, the fire service would need all of its capability for fire fighting. Therefore, it appears logical to assign F 4, Rescuing, to the police service.

F 5.2.2 Quarantining. This is an administrative operation involving the exercise of authority to isolate those who might carry communicable disease. It could be performed by the police service or by the medical service. But the functions already assigned to the police service would constitute a substantial work load. And quarantining is related to F 10.2.2.1, Home Care, because the diagnosis of the doctor giving home care would be the source of information as to the need for quarantining.

Therefore, it seems logical to assign F 5.2.2, Quarantining, to the medical service.

## 2. Functions Relating to Resources

F 5.1.1 Operating Water Treatment Plant.

F 5.1.2 Operating Sewage Treatment Plant. These functions are usually quite independent. The water plant supplies treated water to the distribution system; the sewage plant receives untreated sewage from the collection system. Each can operate independently of other civil defense functions in an emergency although both might require support and supplies. The demand on the sewage plant is established by the amount of untreated sewage arriving at its inlet and that is known at the plant. The water plant cannot know the demand except by information from other places, such as the level of water in on-line storage. But failing this information, the plant could set its output at a feasible maximum. This might prove wasteful, but it would be "safe." Therefore, there does not appear to be any basis for assigning these operations to a service except for the supplying of support and supplies. On that basis, they could be assigned to the resource service.

F 6.2.1 Fire Watching. This is the searching for fires when the normal method of fire reporting is impractical because, when the people are in protection, (1) they cannot observe the fires or (2) they cannot communicate with the fire service. Fire watching does not require the normal special skills of the fire service. However, some knowledge of fire and fire suppression can increase the amount and value of the information the watch gives the fire service. Therefore, it seems logical to assign this function to the fire service.

F 8 Protecting Livestock. This is a responsibility of the individual.

F 9. Emergency Shut Down. Except for civil defense facilities this is a responsibility of the individual who owns or controls the facility. In civil defense facilities, it involves the operation of the facility as well as of the processes carried on in the facility. It is not a continuing function. It seems logical, then, to associate it with K 1.4, Establishing Facilities, and assign it to the resource service.

K 1.3.4 Control of Resources. This operation has two elements: (1)

establishing priorities among competing demands for resources and (2) allocating available supplies of resources to competing demands. Establishing of priorities is a matter of setting policy. Insofar as it is done within the metro area, it would logically be done at the metro level. Allocating available supplies is quite another matter. It must be done wherever supplies are available for allocating. This requires detailed information as to the availability of supplies and this information would come from K 1.3.2, Supply. Therefore, it seems logical to assign the control of the use of resources, along with Supply, to the resource service.

### 3. Functions Related to Environment.

F 5.1.3 Disposing of Trash. This is an ordinary operation of society, performed in some places by private organizations and in others by the government. In civil defense, it would be required only after the people had left the shelters. The personnel and much of the equipment used in collecting and disposing of trash would be suitable for employment in F 13.1, Clearing Debris. Therefore, it seems logical to assign this operation to the resource service.

F 5.3 Controlling Vectors. This is also an ordinary operation of society, again performed by both private and government organizations. In governments, it is often included with disposing of trash in a Sanitation Department. For that reason, it seems logical to assign this function to the resource service.

### Special Situation: Shelter and Welfare Services

These two services have several characteristics in common:

1. They both perform activities to sustain the people; the individual shelter has a unit of the welfare service.
2. They operate in mutually exclusive situations; the shelter service while the people are in the shelters, the welfare service after the people leave the shelters.

This raises the question of the need for organizing two services. Management personnel would not be in sufficient supply to afford maintaining the welfare service in a standby condition while the people were in shelter or simply disbanding the shelter service when the people come out of the shelters. And to attempt a major reorganization in normal

times is a difficult undertaking; it takes months or years to regain operating efficiency. Therefore, it appears logical to establish one service to perform the operations tentatively assigned above to the shelter and welfare services. And because the sheltering operation occurs first, the combined service might better be known as the shelter service.

#### SUMMARY

The tentative assignments to service are shown in Figure 3.11. These assignments can only be tentative until decentralization, structure of the organization, and information have been considered.

		Service				
		Shelter	Fire	Police	Medical	Resource
Type of Operation	Point	F1 F11 F12 F15	F6.1.1.1 F6.1.1.2 F6.1.2.1		F5.2.3 F10.2.2.2	F5.1.1 F5.1.2 F9 K1.3.4 K1.4
	Area		F6.1.2.2 F6.2.1 F6.2.2	F3 F10.1 F4 F7	F5.2.1 F5.2.2 F10.2.1 F10.2.2.1	F5.1.3 F5.3 F13 F14 K1.3.2 K1.3.3

Fig.3.7 TENTATIVE ASSIGNMENTS OF OPERATIONS TO SERVICES



#### IV. DECENTRALIZATION

It was seen in Chapter II that decentralization is the delegation of authority to make decision by specifying (1) the decision to be made and (2) the position of the one authorized to decide. It was also seen that the following are the principal considerations for the organizing decision as to decentralization:

1. coordination of activities,
2. information availability,
3. capacity to decide,
4. timing of the operating decision,
5. significance of the decision, and
6. communications.

Of these, coordination and information are the more important considerations for organizing civil defense for emergency operations. Capacity can be provided by staffing. Timing relates in a large part to the availability of information; i.e., when the decision must be made rapidly, the needed information will more likely be available where the operation will be performed. Significance of the decision generally relates to the area involved in the operation and this tends to locate the decision automatically. Communications can be provided to fit the decision structure that is adopted. Therefore, this discussion will emphasize coordination and information.

##### COORDINATION

Coordination is the controlling of the performance of two or more activities to increase accomplishments. In organizing it is necessary to consider which activities can be coordinated. In emergency operations there are two kinds of coordination to consider

- a. a local activity with the same activity in other areas, and
- b. a local activity with different activity in the same area.

Coordination of the local activity with the same activity in other areas applies primarily to the supplying of resources in support of local operations. Here the decision requires consideration of the relative need for the resources in several areas. Coordination among areas is

also required for movements of people when the origin and destination are not in the same area. Here the overall route may have to be a compromise between the preferred route in each area. Coordination among differing activities within an area applies to operations in which the primary function requires or needs ancillary functions. It applies also when different activities within an area compete for available resources.

### Relationships Among Operations

In examining the coordination of operations, it is necessary to find significant relationships and, in this context, "significant" is taken to mean those that affect the need for, or the exercise of, coordination. In this sense several classes of relationship can be identified.

1. Cooperative: the first activity requires that the second operate at the same time in such a way that the first can perform its own function. For example, in civil defense, F 3.3, Remedial Moving, requires F 7.2, Maintaining Order, to supply control for the movement.

2. Contingent: the second activity is required to operate as a substitute when the first cannot perform its own function. In civil defense, when F 1. Sheltering, cannot continue to protect or house the occupants of a shelter for any reason, F 3.3, Remedial Moving, is required to move the occupants to some other place.

3. Sequential: the second activity requires the operation of the first in order to produce an output or achieve a condition required by the second for its operation. Sequential relationships may be divided into two types based on the nature of the output:

- a. Action: the first activity produces a substance or achieves a condition required by the second. In civil defense, F 5.1.1, Operating Water Treatment Plant, would have to operate first to produce the water required by F 6.2.2, Fighting Fire. And F 13.1, Clearing Debris, would have to operate first to clear the streets so F 6.2.2, Fighting Fire, could move to the work place.
- b. Information: the first activity produces information required by the second. For example, if the second activity is to supply resources to the first, the first must make known its needs.

Time is but one of the characteristics of the sequential relationship.

In addition, the product of the first activity must be of the quality required by the second. And the quantity of the product of the first activity must serve the needs of the second.

4. Support: the second activity operates to assist the first in the performance of the first's own function. This relationship is found in two forms:

- a. Direct Support: the supporting unit normally performs the same operation as does the supported unit as, for example, when one fire company supports another.
- b. Collateral Support: the supporting unit normally performs an operation different from that of the supported unit as, for example, when K 1.3.2, Supply, supports F 10.1, Medical Care/Collecting.

Direct Support employs the primary capability of the supporting unit. Collateral Support employs a collateral capability of the supporting unit -- in the example, the vehicles and drivers of the supply operation whose primary job is to haul freight. The two kinds of support relationship apply differently in organizing. Direct Support tends to be a matter of assignment of units. On the other hand, Collateral Support tends to be a consideration in the organizing of task forces.

Table 4.1 lists the relationships defined above that appear to exist between civil defense functions and controls.

#### Cooperate Relationships

For the most part, the action relationships are between operations that are subject to disruption by people and Maintaining Order -- F 1.7 in shelter and F 7.2. out of shelter. The other significant action relationships are:

1. F 3., Moving, requires F 7.2, Maintaining Order, to serve as movement control.
2. F 4, Rescuing, requires F 3.3, Remedial Moving, and F 10.1, Medical/Collecting to move the people released.
3. All facility operations require F 9., Emergency Shut Down, to protect their equipment.
4. F 5.1.2, Operate Sewage Treatment Plant, requires water produced by F 5.1.1, Operate Water Treatment Plant.

Primary Function	Relationship					
	Continue	Cooperate	Sequential		Support	
			Action	Information	Direct	Collateral
P1.1	P3.3	P1.7		K2.1		
P1.2	P3.3		P1.1;K1.3.2.1		P13.2	
P1.3	P3.3	P1.7;P9	P1.1;P5.1.1;K1.3.2.1	K2.1	P13.2	
P1.4	P10.1	P1.7	K1.3.2.2		P10.2.2.1	
P1.5.1	P10.1	P1.7	K1.3.2.2	P1.4	P5.2.1;P5.2.3	P10.2.2.1
P1.5.2	P3.3	P1.7	K1.3.2.1		P5.3	
P1.6	P3.3	P1.7	K1.3.2.1		P6.2.2	
P1.7	P3.3				P7.2	
P1.8	P3.3	P1.7	K1.3.2.1	K2.2		
P1.9		P1.7				
P2.1				K2.2		
P2.2			P2.1	P2.1;K2.2		
P3.1		P7.2	P13.1	K2.1;K2.2	K1.3.3	
P3.2		P7.2	P13.1	K2.1;K2.2	K1.3.3	
P3.3		P7.2	P13.1	K2.1;K2.2	K1.3.3	
P4.1		P3.3;P7.2;P10.1	P13.1	K2.1	K1.3.3	P13.1;P13.2
P4.2		P3.3;P7.2	P13.1	K2.1	K1.3.3	P7.1;K1.3.2
P5.1.1		P9	K1.3.2.3	K2.1	P13.2	
P5.1.2		P5.1.1;P9	K1.3.2.3	K2.1	P13.2	
P5.1.3		P7.2	P13.1;K1.3.2.3	K2.1		K1.3.3
P5.2.1		P7.2	P13.1;K1.3.2.3	P10.2.2.1;K2.1	K1.3.3	
P5.2.2		P7.2	P13.1;K1.3.2.3	P10.2.2.1;K2.1	K1.3.3	
P5.2.3		P10.1			P10.2.2.2	
P5.3		P7.2	P13.1;K1.3.2.3	K2.1	K1.3.3	
P6.1.1.1					K2.1	
P6.1.1.2		K3.2.1				
P6.1.2.1		K3.2.1				
P6.1.2.2		P7.2	P5.1.1;P13;K1.3.2.3	P3.3;P6.2;K2.1		
P6.2.1		P7.2	P13.1	P1.6;K2.1	K1.3.3	P7.1
P6.2.2		P7.2	P5.1.1;P13;K1.3.2.3	P6.2.1;K2.1	P1.6	
P7.1			P13.1;K1.3.2.3	K2.1	K1.3.3	P7.2
P7.2			P13.1;K1.3.2.3	K2.1;K2.2	K1.3.3	P7.1
P8				K2.1;K3.1		
P9				P2.2		
P10.1		P7.2	P13.1;K1.3.2.3	P4.1;P5.2.3 P6.1.2.2;P6.2.2 P7;P13;P10.2 K2.1	K1.3.3	K1.3.2
P10.2.1		P7.2	P13.1;K1.3.2.3	P4;P6.1.2.2 P6.2.2;P7 P13;K2.1	K1.3.3	P10.2.2
			P13.1;K1.3.2.3		K1.3.3	P10.2.1;P10.2.2
P10.2.2.2		P7.2	P5.1.1;P5.1.2;P10.1; K1.4.3;K1.3.2.2			P10.2.1 P10.2.2.1
P11.1		P7.2;P12.2	P5.1.1;K1.4.4		P13.2	
P11.2		P7.2;P12.1	K1.3.2.3;K1.4.4			
P12.1	P3.3	P11.2	K1.4.4			
P12.2		P11.1;P7.2	P5.1.1;P13;K1.4.4			
P13.1		P7.2	K1.3.2.3	K2.1;K2.2	K1.3.3	P5.1.3;P14
P13.2		P7.2	P13.1;K1.3.2.3	K2.1;K2.2	K1.3.3	
P14.1		P7.2	P5.1.1;P13.1	K2.1	K1.3.3	

Table 4.1 RELATIONSHIPS AMONG OPERATIONS

Primary Function	Relationship					
	Continue	Cooperate	Sequential		Support	
			Action	Information	Direct	Collateral
P14.2		P7.2	P13.1	K2.1;K2.2	K1.3.3	
P15		P7.2	K1.3.2.3;K1.4.4			
K1.1.1				K2.1	K2.2	
K1.1.2		K3.2				
K1.2				K2.1	K2.2	
K1.3.1.1				(opn.);K2.2	K2.1	
K1.3.1.2				(outside);K2.2	K2.1	
K1.3.2.1		P7.2;K1.3.4	P13.1	P1;K2.1	K1.3.3	
K1.3.2.2		P7.2;K1.3.4	P13.1	P1.4;P1.5; P5.2.1;P10.2;K2.1	K1.3.3	
K1.3.2.3		P7.2;K1.3.4	P13.1	(opn.);K2.1		
K1.3.3		P7.2	P13.1	(opn.);K2.1	P13.2	
K1.3.4			K3.2	K2.1;K2.2		
K1.4.1		P9	P13;K1.3.2.3	K2.1	P13.2	
K1.4.2		P9	P13;K1.3.2.3	K2.1;K2.2	P13.2	
K1.4.3		P10.2.2.2	P5.1.1;P13.1;K1.3.2.3	K2.1	P13.2	
K1.4.4		P11;P12;P15	P13;K1.3.2.3	K2.1	P13.2	
K2.1.1				K3.1.1	K3.1.2;K3.1.3	
K2.1.2				K3.1.1.3	K3.1.2;K3.1.3	
K2.1.3				K3.1.1.4	K3.1.2;K3.1.3	
K2.2.1				K2.1		
K2.2.2				K2.2.1;K2.1	K3.1.2	
K3.1.1.1.1				K2.1	P1;P12	P7;P15
K3.1.1.1.2				K2.1	P1;P10.2.2;P12	P3.1.2;P9;P13
K3.1.1.1.3				K2.1	P1;P10.2.2	K2.1.1
K3.1.1.2.1				K2.1	P13.2;K1.3.2	
K3.1.1.2.2				K2.1	(opn);K2.2	
K3.1.1.3.1.1				K2.1	P6;P7	K2.1.2
K3.1.1.3.1.2				K2.1	P6;P7	K2.1.2
K3.1.1.3.1.3				K2.1	P10.2	
K3.1.1.3.1.4				K2.1	P5.3	P1;K1.4
K3.1.1.3.2.1					K2.1.2	
K3.1.1.3.2.2				K2.1	P13.2	P4;P6
K3.1.1.3.2.3				K2.1		P3;P4;P5;P6; P7;P10.1;P14; K1.3.2;K1.3.3
K3.1.1.3.2.4				K2.1	P6.2	P1.6;K1.4
K3.1.1.3.2.5					K2.1.2	P4;P5;P6;P7; P10.1;P13; P14;K1.3.3
K3.1.1.4						(org. unit)
K3.1.2				K3.1.1	K2	
K3.1.3				K3.1.1;K2;K3.1.2		
K3.2.1		P9		K2.1	K3.2.2;P13.2	
K3.2.2				K2.1	P13.2	
K3.2.3				K2.1	K1.3.3	
K4.1				K2.2	K2.1	
K4.2				K4.1		
K5.1		P3.2		K4.2		
K5.2				K2.1		

Table 4.1 RELATIONSHIPS AMONG OPERATIONS

5. F 5.2.3, Isolating requires F 10.2.2.2, Medical/Facility Care, to establish the quarantined hospital and F 10.1 Medical/Collecting, to move the patients to it.

6. F 2.2, Warning/Informing, F 6.1.1.2, Passive Fire Screening, and F 6.1.2.1 Passive Fire Inhibiting, require K 3.2, Communications, for instructing the public. K 1.1.2, Assigning External Authority, requires external communications to ascertain what the surviving command relationships are. Conceivably, all other functions could be performed without any communications other than face-to-face exchange of information between people. The net effect of communications would be to increase efficiency, effectiveness, or both.

7. F 13, Restoring Facilities, requires K 1.3.3, Transport, both for clearing debris and for hauling repair or replacement materials.

8. K 1.3.2, Supply, requires K 1.3.4, Control, to assure that available supplies are devoted to their best use.

#### Contingent Relationships

There are only two operating options in civil defense other than the one that is always available -- to take an action or not to take it:

1. Given an in-shelter problem, the option is between (1) solving the problem or (2) leaving the shelter. In some cases, part of the shelter population would be moved, in others, all would move. If those to move were well, F 3.3, Remedial Moving, would be required. If they were ill, F 10.1 Medical/Collecting would be required.

2. Given a shortage of housing in the area, the option would be between (1) building housing and (2), as shown, F 3.3, Remedial Moving, of some or all of the people to an area in which housing was available.

#### Sequential Relationships

This is the most numerous class of relationships in civil defense. However, most of them fall into two major groups:

##### 1. Action

a. Supplying Resources. Most civil defense functions can require additional resources -- support, materials, or transport -- while they are operating. In each case, the resources must be supplied before the

operation in which they are to be used can be performed. Continuing operations that are being performed while they are being supplied additional resources are operating on resources previously supplied.

b. Restoring Facilities. Given attack-caused damage -- by shock and wind or by fire -- debris will interfere with movement in or to field operations. Then should damage occur, F 13.1, Clearing Debris, would be required to precede any other field operation. Similarly, when establishing facilities, F 13.1, Clearing Debris, would be required to precede any other field operation. Similarly, when establishing facilities, F 13.1, Clearing Debris, would be required to allow access and F 13.2, Repairing and Replacing, to put the facility into usable condition.

## 2. Information.

a. Supply. All of the "supplying resources" relationships require a preceding information relationship: the using activity must make its needs known to the supplying activity. In some cases, this knowledge can be built into the operating plan or procedures in the form of standard resupply orders. However, most civil defense emergency operations do not lend themselves to this standardization.

b. Site Conditions. Area-type activities need information about site conditions -- at the work place and enroute to it -- before leaving the assembly place. In Table 4.1 these relationships are shown between the operation and K 2.1, Analyzing Problems.

c. Planning. The operations of Informing, Planning, Deciding, and Commanding -- K 3, 2, 4, and 5 -- are sequential; i.e., each requires the information produced by the preceding operation.

### Direct Support Relationships

The direct support relationships fall into three major classes:

1. Shelter. In-shelter operations would be supported by their counterparts outside the shelters and, in the case of fire watching and fighting, vice versa.

2. Transport. All field operations using general-purpose vehicles would be supported by K 1.3.3, Transport. This would be the situation



when a motor pool was established in a MSA -- either in lieu of or in addition to equipping field units with organizational equipment.

3. Data. All operations require information about site conditions at the work place and they observe conditions and use this information as a matter of course. These operations can supply such of these data as are required for general use. It appears that most of the data acquisition requirement can be accomplished in this manner.

#### Collateral Support Relationships

The collateral support relationships shown in Table 4.1 indicate the kinds of such relationship that can exist. There is no intent here that Table 4.1 list complete -- or even extensive -- coverage. In collateral support, the supporting unit employs capabilities it has, but in a way or for a purpose that differs from its normal mission. It should not be expected that collateral support would be covered completely in an organization or operation plan. In many cases it would emerge depending on the exigencies of the situation and the capabilities available at the moment.

Examples of collateral support are:

1. Equipment. F 13.1 and F 13.2, Restoring Facilities, can use heavy equipment in support of F 4, Rescuing, in heavy rescue. And F 7.1, Suppressing Crime, and the motorized part of K 1.3.2, Supply, can support light rescue.

2. Skill. Each of the treatment units of F 10, Medical Care, can support the others because they have basic medical skills even though their specialties differ.

3. Information. Some operations would provide direct support to the data acquisition function. Others can give collateral support by supplying partial data. For example F 13.1, Clearing Debris, is the one function that would be fully qualified to supply full data on the debris situation. But any other unit working out of doors could observe whether a given street was passable and it could make this known.

4. System Information. System units are the best source of information about their condition. They can report this although they are not organized for the purpose.

### Sets of Operations.

How these relationships apply in considering coordination depends on which of the operations would be performed in the same situation. An examination of the requirements for operations shows that six sets of operations can serve for study of organizing for emergency operations. These sets relate to the classification of operations by persons served/ by location in Figure 8.2. This relationship is shown in Figure 4.1 which also shows the ALFA NEOP events in which each set would operate. For example, the "In Protection-Fire Black" set of operations would function in ALFA NEOP events CI, DI, and EI.<sup>1/</sup>

Internal differences can be found within the sets because the requirements can differ some between ALFA NEOP events--say, between CII and CIII. But these internal variations are minor compared to the differences between sets and they have no real significance for organizing.

The operations included in each of these sets are shown in Figure 4.2. In this figure

- a. the primary operations are those that directly serve the performance requirements, and
- b. the ancillary operations are those that serve the primary functions classified by the relationships shown in Table 4.1.

### LEVELS OF MANAGEMENT

Two of the traditional "principles" of organizing that affect the number of levels of management are:

1. Span of Control: as few subordinates reporting to a superior as possible.
2. Short Chain of Command: as few levels of management as possible between the supreme authority and the rank and file worker.

These two are at odds; a smaller span of control tends to mean a longer chain of command. The final solution may be a compromise between the two. But it may be decided on considerations that do not include either.

Two levels of management can always be identified: (1) supervision at the work place and (2) the supreme authority. In local civil defense, the supreme authority is the head of the local government.

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1. See Appendix A.

Persons Served		Condition	ALFA Neop Event																	
			A		B					C			D			E				
					V	VII	I	II	III	IV	V	I	II	III	IV	I	II	III	IV	
Normally Distributed	Normally Distributed	Fire	●	●																
Moving to Shelter	Moving to Shelter				●															
In Protection Fire Black	In Protection	Black									●				●				●	
In Protection Fire Not Black		Any																		
In Protection Attack Ended		Any					●	●	●		●	●	●						●	●
		BOS2 (Att.End.)														●			●	
In Housing Attack Ended	In Housing	BOS1 (Att.End.)														●			●	

Fig.4.1 SETS OF OPERATIONS

CIVIL DEFENSE OPERATING SYSTEM OPERATIONS					
Purpose	Primary Operations	Ancillary Operations			
		Contingent	Cooperate	Sequent.Action	Direct Support
CRISIS	Moving	F3.1 Strat.Moving F10.1 Med.Collect	P7.2 Maint.Order	P13.1 Clear.Debris	K1.3.3 Transport
	Protection	F6.1.1.1 Pass.Sern F6.1.2.1 Pass.Inhib P9 Emerg.Sht.Dwn	K3.2.1 Wireless Com		
	Mobilizing	F1 Sheltering K1.2 Staffing K1.4.1 Est.Contr.Pac K1.4.2 Est.MSA Pac. K1.4.3 Est.Med.Pac.	P9 Emerg.Sht.Dwn		P13.2 Repr.& repl.
	Warning	F2.1 Alerting F2.2 Informing	K3.2.1 Wireless Com	F2.1 Alerting	
	Moving	F3.2 Tact.Moving F10.1 Med.Collect.	P7.2 Maint.Order	F13.1 Clr.Debris	K1.3.3 Transport
MOVING TO SHELTER	Protection	F1 Sheltering F6.1.1.1 Act.Sern P8 Prot.Livestock P9 Emerg.Sht.Dwn		F5.1.1 Op.Wat.Plnt F5.1.2 Op.Sew.Plnt	
	Fire	F6.1.2.2 Act.Inhib. F6.2.1 Fire Watch F6.2.2 Fight.Fire	F7.2 Maint.Order	F5.1.1 Op.Wat.Plnt P13.2 Repr.& Repl.	K1.3.3 Transport
	Protection	F1 Sheltering F3.3 Remed.Moving F10.1 Med.Collect.		F5.1.1 Op.Wat.Plnt F5.1.2 Op.Sew.Plnt	F5.2. Contr.Disease F5.3 Contr.Vectors F6.2.2 Fight.Fire F7.2 Maint.Order F10.2.2.1 Home Care F13.2 Repr.& Repl.
IN PROTECT-FIRE BLACK	Moving	F3.3 Remed.Moving F10.1 Med.Collect.	F7.2 Maint.Order	F13.1 Clr.Debris	K1.3.3 Transport
	Fire	F6.1.2.2 Act.Inhib. F6.2.1 Fire Watch F6.2.2 Fight.Fire	F4 Rescuing F7.2 Maint.Order F10.1 Med.Collect. F10.2.1 First Aid	F5.1.1 Op.Wat.Plnt. F13.1 Clr.Debris P13.2 Repr.& Repl.	F1.6 Shelt.Fir.Plt. K1.3.3 Transport
	Protection	F1 Sheltering F3.3 Remed.Moving F10.1 Med.Collect.		F5.1.1 Op.Wat.Plnt F5.1.2 Op.Sew.Plnt K1.3.2.1 Shelt.Supp K1.3.2.2 Med.Supply	F5.2 Contr.Disease F5.3 Contr.Vectors F6.2.2 Fight.Fire F7.2 Maint.Order F10.2.2.1 Home Care F13.2 Repr.& Repl.
IN PROTECT-FIRE NOT BLACK	Moving	F3.3 Remed.Moving F10.1 Med.Collect.	P4 Rescuing P7.2 Maint.Order	F13.1 Clr.Debris.	K1.3.3 Transport
	Fire	F6.1.2.2 Act.Inhib. F6.2.1 Fire Watch F6.2.2 Fight.Fire	P4 Rescuing F7.2 Maint.Order F10.1 Med.Collect. F10.2.1 First Aid	F5.1.1 Op.Wat.Plnt F13.1 Clr.Debris F13.2 Repr.& Repl.	F1.6 Shelt/Fir.Plt. K1.3.3 Transport
	Medical	P10.2.2.2 Facility Care	F7.2 Maint.Order	F5.1.1 Op.Wat.Plnt F10.1 Med.Collect. K1.3.2.2 Med.Supply K1.3.2.3 Oth.Supply K1.4.3 Est.Med.Pac	
	Environment	F14.1 Decontam. Facilities	F7.2 Maint.Order	F5.1.1 Op.Wat.Plnt F13.1 Clr.Debris	K1.3.3 Transport

Fig.4.2 SETS OF OPERATIONS

Purpose	CIVIL DEFENSE OPERATING SYSTEM OPERATIONS				
	Primary Operations	Ancillary Operations			
		Contingent	Cooperate	Sequent.Action	Direct Support
IN PROTECTION-ATTACK ENDED-3032	Protection	P1 Sheltering P3.3 Hemed.Moving P10.1 Med.Collect.		P5.1.1 Op.Wat.Plnt P5.1.2 Op.Sew.Plnt K1.3.2.1 Shelt.Sup	P5.2 Contr.Disease P5.3 Contr.Vectors P6.2.2 Figh.Fire P7.2 Maint.Order P10.2.2.1 Home Care P13.2 Repr.& Repl.
	Rescue	P4 Rescuing	P3.3 Hemed.Moving P7.2 Maint.Order P10.1 Med.Collect. P10.2.1 First Aid	P13.1 Clr.Debris	K1.3.3 Transport
	Moving	P3.3 Hemed.Moving P10.1 Med.Collect.	P4 Rescuing P7.2 Maint.Order	P13.1 Clr.Debris	K1.3.3 Transport
	Fire	P6.1.2.2 Act.Inhib. P6.2.1 Fire Watch P6.2.2 Figh.Fire	P4 Rescuing P7.2 Maint.Order P10.1 Med.Collect. P10.2.1 First Aid	P5.1.1 Op.Wat.Plnt P13.1 Clr.Debris P13.2 Repr.& Repl. K1.3.2.3 Oth.Supply	P1.6 Shelt/Fir.Pit. K1.3.3 Transport
	Medical	P10.2.2.2 Facility Care	P7.2 Maint.Order	P5.1.1 Op.Wat.Plnt P10.1 Med.Collect. K1.3.2.2 Med.Supply K1.3.2.3 Oth.Supply K1.4.3 Est.Med.Fac.	
	Environment	P14 Decontam.	P7.2 Maint.Order	P5.1.1 Op.Wat.Plnt P13.1 Clr.Debris	K1.3.3 Transport
IN HOUSING-ATTACK ENDED-3031					
	Sustain People	P12 Housing P11 Feeding P15 Welfare Serv.	P3.3 Hemed.Moving P7.2 Maint.Order	P5.1.1 Op.Wat.Plnt P5.1.2 Op.Sew.Plnt P13 Restor.Facil. K1.3.2.3 Oth.Supply K1.4.4 Est.Welf.Fac	
	Health	P5.2 Contr.Disease P5.3 Contr.Vectors	P7.2 Maint.Order P10.1 Med.Collect.	P13.1 Clr.Debris K1.4.3 Est.Med.Fac.	P10.2.2.2 Fac'l.Care K1.3.3 Transport
	Medical	P10.2.2.1 Home Care		P13.1 Clr.Debris K1.3.2.2 Med.Supply	K1.3.3 Transport
		P10.2.2.2 Facility Care	P7.2 Maint.Order	P5.1.1 Op.Wat.Plnt P5.1.2 Op.Sew.Plnt P10.1 Med.Collect. P13 Restor.Facil. K1.3.2.2 Med.Supply K1.3.2.3 Oth.Supply K1.4.3 Est.Med.Fac.	
	Fire	P6.1.2.2 Act.Inhib. P6.2.2 Figh.Fire	P7.2 Maint.Order	P5.1.1 Op.Wat.Plnt P13 Restor.Facil. K1.3.2.3 Oth.Supply	
	Environment	P5.1.3 Disp.Trash P13 Restor.Facil. P14 Decontam.	P7.2 Maint.Order	P5.1.1 Op.Wat.Plnt	K1.3.3 Transport
	Rescue	P4 Rescuing	P3.3 Hemed.Moving P7.2 Maint.Order P10.1 Med.Collect. P10.2.1 First Aid	P13.1 Clr.Debris	K1.3.3 Transport

Fig.4.2 SETS OF OPERATIONS

Current doctrine for local emergency civil defense operations envisions an operating zone about 25 sq. mi. in area and containing up to about 100,000 people.<sup>1/</sup> It is based on the concept that attack-caused conditions would be approximately the same throughout the area. In many localities, the operating zone would contain the whole locality. In this case the supreme local authority and the supreme zonal authority would be the same. But in those localities whose area or population exceeded the established limits, the locality would be divided into two or more operating zones as appropriate. Thus the minimum number of levels of management would be 2 or 3 depending on the size of the locality.

Current civil defense thought also envisions the establishment of Multipurpose Staging Areas (MSA). The MSA would be a place at which various civil defense forces would assemble and from which they would operate. Thus the MSA is equivalent to the assembly place for area operations as these terms are used in this study. As most of the area operations need coordination with others, the MSA seems to be a logical place at which to achieve at least some of the required coordination.

If only one MSA is established in a zone, the zone headquarters could be located there and the problem of lengthening the chain of command would not arise. But when more than one MSA is activated in a zone and setting up a coordinating authority at the MSA is considered, the problem of lengthening the chain of command must also be considered.

Creation of a new management echelon between the work place and an existing one does not necessarily lengthen the real chain of command. Whether it does or not depends on what decisions are made at the new management level and what are made at the preexisting level. If the operating decision for a given operation is moved from the old to the new, the chain of command for that operation has not been increased significantly.

Decentralization, then, seems to be a solution for the chain of command problem. That is, it can be if decision authority is truly decentralized. This means that the manager delegates full decision

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1. Office of Civil Defense, Concept of Operations under Nuclear Attack, Federal Civil Defense Guide, Part G, Chapter 1, Appendix I.

authority and the subordinate accepts it fully.

In the matter of civil defense operations, decentralization appears desirable because of the possibility that communications would be inhibited. Communications would never be completely impossible. Even when all electronic communications were destroyed, communication by messenger would still be possible. But the cost might be unacceptable; it might mean the death of the messenger or, the time taken to deliver a message by hand might be too long if the distance were long.

Decentralization becomes automatic when communications are lost or too difficult to maintain. Then the higher level could not communicate any decision it chose to make. And, while progress reporting to the supreme authority might be desirable, it is not always necessary. At Normandy, General Bradley said, "When I regain communications with the troops, I will resume command." And President Lincoln did not hear from General Sherman at any time during his march from Atlanta to Savannah.

To decentralize -- by necessity or by choice -- during the operating situation would be difficult. Decisions require information. One of the purposes of organizing is to assure the availability of the required information where the decision is to be made. And while it may be easy for a supervisor to assume greater decision authority in accordance with a plan, it may be impossible for him to rearrange the information flow to bring him the information he needs when he needs it.

Therefore, it would seem prudent to organize for conduct of local emergency operations on the assumption that communications between levels would be either (1) nonexistent or (2) obtainable only at great cost. When so organized, loss of communications would disrupt the operations least. And so long as communications were available, the overall operation should be more effective and efficient.

As a preliminary to considering where to assign decision authority and concluding as to the desirable number of management levels, it is desirable to examine -- in general terms -- the kinds of decisions to be made, the information required, and the primary sources of information.

#### INFORMATION FOR OPERATING DECISIONS



The decision process has three steps -- planning, deciding, and commanding -- each of which involves the making of a number of subordinate decisions. These subordinate decisions may be conscious or unconscious, implicit or explicit. They may be founded on information, on assumptions, or on guesswork. They may be made by different people or by one man.

#### Planning.

Planning has two parts:

- a. Analysis, in which information about a situation is examined to discover deviations from an accepted norm and to describe the deviations.
- b. Synthesis, in which available operating capabilities are considered as solutions to a problem and alternative solutions are compared in terms of relative effectiveness and cost.

The intensiveness and extensiveness of planning can vary from the subconscious response in a reflex reaction to a major study costing months of time and thousands of dollars. In civil defense emergency operations, the extent of the planning effort would be limited chiefly by time and availability of information. Time would not permit examination of every alternative in depth. And communications might be so degraded as to limit information severely.

The major planning decisions to be made in the emergency have to do with (1) problems and (2) solutions.

A. The planning decisions relative to the problem are:

1. A problem exists or will exist: yes or no. As the term is used here, a problem is a deviation from what is considered to be normal. In the civil defense emergency operating situation, problems are of two general kinds:

- a. Hazard: this is some threat to the security or well being of the people, to their property, or to the operating capability of the civil defense system.
- b. Requirement: this is an unfilled demand for support for operating units of the system or for supplies, services, or facilities either for the people or for the system.

The problem to be solved may not be the one that is immediately apparent. The one to be solved is that posed by the underlying cause of the apparent

problem. This problem is defined by the cause -- its nature and quantity -- and by the rate and direction of any change in the quantity.

2. Severity of the problem. The severity of the problem is measured by the projected results if the problem is not solved. For example, a problem exists when a building is on fire. The severity of this problem depends whether the building will be destroyed, whether people will be injured, whether the fire will spread to other buildings, and so on, if the fire is not extinguished.

3. Timing of the problem. If the problem does not already exist and is predicted to exist in the future, it is necessary to predict when it will become a problem.

8. The planning decisions relative to the solution are:

1. What can be done about the problem. This depends on the problem and on the available system capability in terms of:

- a. the quantities of personnel, equipment, supplies, and facilities at hand and ready for employment or use; and
- b. the ability to employ or use these assets including (1) the ability to communicate the necessary information from its source to where it is needed.

The inherent capabilities of the system may permit operations in addition to those for which the system was designed.

2. How the problem would be affected. This is an estimate of the change that the available capability can make in the severity of the perceived problem. In other words, given the available capability, how much can the projected results of the problem be alleviated?

3. What damage would be done to the system. This is the estimating of (1) how much the personnel, equipment, and facilities of the system would be damaged in the operation, (2) how much the supplies would be depleted, (3) how much the system capability would be reduced, and (4) whether any of these was, in fact, an adverse effect. For example, supplies are intended to be expended and, if no further requirement were likely, their depletion would not be adverse.

4. What other problems the solution would cause. This is the estimating of whether the proposed solution would cause other problems, what

they would be, and whether they would be more severe than the one being considered.

### C. Deciding.

Selection of the preferred action to be taken would be based on the conclusions drawn in the planning decisions and would result in the following decisions:

1. Whether to take any action. Selection of an action to be taken is an exercise of executive prerogative. In this the executive evaluates -- in the true sense of the word -- the alternatives. And he may conclude that none of the alternatives appears worth the cost or the risk. In this case, he would decide to do nothing or, rather, to allow what is being done to continue.

2. What is to be done. Given a decision to do something, this is a selection from the available alternatives. Again this is an exercise of executive prerogative in selecting the course of action that seems most worth the cost or risk.

3. When the action is to start. In many cases, the problem forces this decision. For example, the sooner most fires are attacked, the more effective suppression will be. On the other hand, to proceed immediately with a remedial movement may incur more damage than to wait until the dose rate declines. Generally, then, this decision depends on the severity and timing of the problem and the projected effectiveness of the solution.

4. Who is to perform the operation. This is assignment of work and it is possible only when a choice is available. At this level of decision, assignment of a task would ordinarily be made to a major organizational element. For example, metro might direct zone C to send fire service support to zone A. But some fire service commander in zone C would designate the units to go.

Figure 4.3 shows the input information required for these decisions. The rows represent the decisions; the columns, the kinds of information. Each cell asks the question, "Does this decision require this kind of information?" A mark in the cell means, "Yes." For example, to decide

DECISIONS TO BE MADE										INPUT INFORMATION																							
4Cmd	3.Action	2.Solutions				1.Problem				2.Data																							
		3.Sys.Dam	4.Other Problems	1.Problem		3.Severity	4.Timing	1.People	2.Property	3.System	1.Support	2.Supplies	3.Services	4.Facilities	1.Number	2.Location	3.Condition	1.Availability	2.Requirement	1.Weather	2.Surface	3.Disease	4.Vectors	1.Attack	2.Damage	3.Debris	4.Fire	5.Radiation	1.Personnel	2.Equipment	3.Supplies	4.Facilities	
				2.Effect on Problem	1.Problem																												
																																	1.Condition

whether a hazard to people exists the following kinds of information would be required:

- a. People: how many, where, what protection they have, whether ill or injured, what radiation doses they have received.
- b. Natural environment:
  - (1) weather: precipitation, wind, temperature,
  - (2) disease: diagnosis of communicable disease, where, spreading rate; and
  - (3) vectors: what kind and where they are.
- c. Attack environment:
  - (1) attack: possibility of nearby detonation, occurrence of nearby detonation, etc.;
  - (2) damage: where, what damaged, how severe;
  - (3) fires: where, under control, uncontrollable; and
  - (4) radiation: dose rate, where, increasing or decreasing.

Given these kinds of information about the people and about conditions in their environment it is possible to conclude whether a hazard to them exists. Given information about how the conditions in the environment are changing -- increasing or decreasing, and how fast they are changing it is possible to decide

- (a) that a hazard will exist and when,
- (b) that an existing hazard will get worse and when,
- (c) that an existing hazard will cease to exist, and when, and
- (d) so on.

Similarly a decision as to what alternative actions to be considered would require information about

- (1) Problem: to find what actions might be effective against the problem.
- (2) Attack Environment: to find which of the actions that might be effective could be taken in view of the damage, debris, fire, and radiation conditions.
- (3) System: to find whether the system could take the actions effectively in view of the availability of personnel, equipment, supplies, and facilities.

Some of this information is in the form of data; i.e., facts about the situation as it exists or projections of how it will be. The remaining inputs are the findings of preceding steps in the analysis. These data are required for objectively rational decisions -- that is, those that are correct for maximizing the feasible solution of the problem in the situation. Of course, if any of the data are not available, the

decisions can still be made. In that case, they can be only subjectively rational; i.e., correct for maximizing accomplishment relative to the available knowledge.

Figure 4.4 identifies the organization levels at which information for decision would be available by direct observation and the levels at which it would be needed for two cases

- (1) when the forces were at the work place and
- (2) when they were at the assembly place.

The decisions are represented by the rows; the location of the need for information, by the columns headed "Required"; and the location where the information is available directly, by the columns headed "Available." The decisions considered -- in the rows -- are the same as in Figure 4.3.

In Figure 4.4 it can be seen, for example, that, when the forces are at the work place, information for a decision as to the existence of a hazard to people would be needed at the work place and would be available there. On the other hand, when the forces are at the assembly place, the information for the same decision is needed at the assembly place but it is still available at the work place.

In the case of the action decisions, in Figure 4.4, the decision may be made either where the forces are or at a higher level. In Figure 4.4, this contingency has been flagged by partially filling some of the cells to indicate

- (a) under "Required", that the information may be required only for some action decisions because others would be made at a different level; and
- (b) under "Available", that only part of the required information would be available directly at the level at which the decision was made.

This analysis is quite general because information requirements and availability would differ with the operation. Therefore, the locations shown would not apply to every operation in every situation. That is not important here. What is important is the fact that in many cases, the information necessary for the decision is not available where the decision would seem to be preferably located. Therefore, it appears necessary to examine each operation to find where the decision would best be located,



DECISIONS TO BE MADE										Forces At Work Place				Forces At Assembly Place											
										Site		Section		Zone		Metro		Site		Section		Zone		Metro	
										Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail
										Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail	Req.	Avail
1. Problem	1. Nature	1. Hazard	1. People																						
			2. Property																						
			3. System																						
		2. Requirement	1. Support																						
			2. Supplies																						
			3. Services																						
	4. Facilities																								
	2. Severity																								
	3. Timing																								
	2. Solutions	1. Alternatives	1. Problem																						
2. System Capability			1. Condition																						
			3. Ability to Move																						
			4. Ability to Communicate																						
2. Effect on Problem																									
3. Damage to System		1. Personnel																							
		2. Equipment																							
		3. Supplies																							
		4. Facilities																							
4. Other Problems																									
3. Action	1. Take Action?																								
	2. What Action?																								
	3. When Start?																								
	4. By Whom?																								
4. Command	1. Instruct.																								
	2. To Whom																								



given the probable availability of information and the consequent need for communications.

#### PREFERABLE DECISION LOCATIONS

Preferable locations for decision depend largely on

- a. the type of operation: point or area.
- b. the location of the involved operating forces when the decision is to be made, and
- c. the areas involved in the operation.

The following discussion applies these considerations and draws tentative conclusions as to their preferable location as shown in Figure 4.5. The discussion examines first the operations for which the decision locations seem clear and then those for which there are alternatives.

#### Point Operations

F 1. Sheltering. All decisions affecting operations within the shelter must be made within the shelter whenever a loss of communications would preclude promulgating a decision made elsewhere. When communications are available, they can provide information to assist the shelter decision maker. On the other hand, decisions affecting movement to or from the shelter -- support, supply, and movement -- cannot be made within the shelter because the required information would not be available there when communications had failed.

#### F 2. Warning.

1. Alerting. The decision to alert must be made at metro because (1) attack information would come first to metro and (2) the alert serves the whole metro area.

2. Informing. The informing decision must also be made at metro because (1) the information applies throughout the metro area and (2) this information is an expression of policy for which metro must be the source.

#### F 5.1.1. Operating Water Treatment Plant.

F 5.1.2. Operating Sewage Treatment Plant. All decisions affecting operations within the plant -- to operate or not, to repair or not, staffing, and technical matters -- should be made within the plant. In theory, the water plant should operate to meet the demand. However, if communications are lost, the safe decision is to assume that the demand

CIVIL DEFENSE OPERATING SYSTEM FUNCTIONS										Area Served					Decision At				
										Site	Sect	Zone	Metro		Site	Sect	Zone	Metro	
1. Sheltering																			
2. Warning																			
3. Moving																			
1. Strategic																			
2. Tactical																			
3. Remedial																			
4. Rescuing																			
1. Oper. Water Plnt																			
2. Oper. Sewer. Plnt																			
3. Dispos. Trash																			
1. Dis. 1. Inoculating																			
2. Quarantining																			
3. Isolating																			
2. Cont. 1. Sanit																			
3. Controll. Vectors																			
1. Active																			
2. Passive																			
1. Active																			
2. Passive																			
1. Watch																			
2. Fight.																			
2. Suppress.																			
1. Prevent																			
6. Fire Fight.																			
1. Screen																			
2. Inhibit																			
7. Maintain Law&ord.																			
1. Suppr. Crim																			
2. Maint. Ord.																			
8. Protect. Livestock																			
5. Maint. Health																			
1. Collecting																			
1. First Aid																			
2. Gen Care																			
2. Facil.																			
1. Prep&Serv																			
2. Dist. Food																			
1. Pillet.																			
2. Comm. Lodg.																			
1. Clr. Debrls																			
2. Repr&Repl																			
1. Facilities																			
2. Terrain																			
15. Welfare Services																			
1. Ass'gning Authority																			
2. Staffing																			
1. Support																			
2. Supplies																			
3. Transport																			
4. Control																			
3. Supply Resources																			
4. Estab. Facilities																			
9. Emerg. Shut Down																			
10. Med. Care																			
11. Feeding																			
12. Housing																			
13. Restor. Facil.																			
14. Decontam																			
15. Welfare Services																			
1. Ass'gning Authority																			
2. Staffing																			
1. Support																			
2. Supplies																			
3. Transport																			
4. Control																			
4. Estab. Facilities																			

Fig. 4.5 PREFERRED DECISION LOCATIONS

exists and to continue to operate so long as conditions permit. The sewage plant will know the demand when sewage arrives at the plant inlet. In this case, the safe decision is, again, to operate so long as conditions permit. Decisions involving movement from or to the plant must be made elsewhere because the required information would not be available at the plant.

F 5.2.3. Isolating.

F 10.2.2.2. Facility Care. These are similar operations, differing only in that the lazarette provides isolation for communicable diseases. Two kinds of decision are involved:

1. To start operating: this decision requires information as to the attack hazard (metro), the availability of facilities (site), and the general site conditions (site and section). Therefore, this decision could be made at section, zone, or metro and the preference depends on the organizing decision as to information flow.

2. How to operate: all the decisions as to operations within the facility are best made there because the information as to requirements for and availability of resources are available there.

The decision as to whether to move additional patients to a given facility might be made at the facility because it has the information as to its capacity to accept more patients. However, other information needed for this decision -- e.g., case loads at all such facilities and site conditions affecting movement of patients -- would not be available at the facility. All decisions involving movement to and from the facility -- support, supply, movement of patients, and remedial movement of the facility -- must be made elsewhere.

F 6.1.1.1. Active Screening. The decision to activate the screen and those preliminary to it would best be made at metro because (1) the screen would serve the whole metro area and (2) activation of the screen should be coordinated with the warning decisions that are made at metro. In addition, the activation decision depends on information as to attack timing. This would be available at metro.

F 6.1.1.2. Passive Screening.

F 6.1.2.1. Passive Inhibiting. These are two-part operations; they involve (1) issuing of advice and instructions, and (2) taking action to

implement the advice and instructions. Decisions as to what advice and instructions to give and when to give them are best made at metro because (1) these activities serve the whole metro area and (2) the taking of these actions is related to the attack situation and information about this is available at metro. On the other hand, decision as to what action to take to implement the advice and instructions must be made at the site because information as to site conditions, requirements, and availability of resources is available there.

F 8. Protecting Livestock. Decisions as to protecting livestock must be made at the site because (1) the system design makes this a responsibility of the individual and (2) information as to requirements and availability of resources is available there.

F 9. Emergency Shut Down. This function involves a number of considerations in deciding what to shut down and when to do it. Shut down of a facility or a piece of equipment depends on (1) the requirement for use of the facility or equipment, (2) the length of time required for the shut down procedure, and (3) control of the facility: government or private. The following decision locations seem appropriate:

1. At Metro

- a. which facilities and services are essential,
- b. when to authorize or advise shut down of non-essential facilities and equipment, and
- c. when to direct shut down of facilities previously decided to be essential.

2. At Site

- a. which equipment, processes, and services are essential;
- b. when to start shut down of non-essential facilities, processes, equipment, and services; and
- c. when to start shut down of previously essential facilities, processes, equipment, and services.

F 11. Feeding. Feeding of the People requires decisions as to:

1. When to start. This depends on when the requirement occurs; i.e., when the people leave the shelters. When to start feeding, then, is a correlative of the decision to leave the shelters and the ability to start feeding would likely be a consideration in the decision to move

people out of the shelters. Therefore, the decision to start feeding would be made wherever the decision to leave the shelters was made.

2. How to feed. This is a choice between (a) establishing facilities to prepare and serve food and (b) distributing food for the people to prepare. This decision would depend largely -- although not necessarily entirely -- on whether the people were to be housed (c) at home or in billets in other peoples' homes or (d) in community lodging facilities. The decision on how to feed would also depend on the availability of facilities in which to prepare and serve and of personnel skilled in cooking for and serving large numbers of people and on the availability of utilities services to private homes. It seems appropriate that this decision be made wherever the housing decision is made.

3. Where to feed. This is a correlative of the decision as to how to feed and would be made at the same level.

F 12. Housing. As in the case of feeding, housing requires decisions as to:

1. When to start. Again, the requirement occurs when the people leave the shelters. And, again, the decision to start housing would be made wherever the decision to leave the shelters was made.

2. How to house. This decision depends in part on how the people are to be fed. It also depends on the availability of (1) private homes for the people to return home or for billeting and (2) of facilities suitable for community lodging. This decision, then, would be appropriate wherever the information was available as to availability of facilities.

3. Where to house. This decision would depend on the availability of facilities and of utility services for them. It is possible that this decision could be made at section if the people from the shelters in that section could be housed there. Similarly it could be made at zone if the people could be housed in the zone. If not at section or zone, the decision would have to be made at metro. If some or all of the people could not be housed in the metro area, metro would have to make the arrangements, but metro would still decide as to how many would be housed in the metro area. However, even though the decision might

be made at section or zone, equity in treatment of all the people in the metro area would seem to make metro the preferable location with respect to the number of people to be housed in each section. Selection of the facilities to be used would best be made at section.

F 15. Welfare Services. Again the decision to start would be correlative to the decision to leave the shelters and would be made at the same place. The operation should be located close to where the people are housed. The information as to availability of facilities would be the same as for housing, so the decision as to locating welfare services might as well be made in the same place; i.e., at section.

K 1. Assigning Authority. Assignment of internal authority goes with the assignment of a job to do and is done at the same place; i.e., throughout the organization. Assignment of external authority is a matter of finding out which element of the organization is able to exercise authority as specified in the operating plan with respect to succession to command. This involves (1) a decision of the superior command to assume the authority and (2) of the subordinate command to accept. This can occur at all levels: site, section, zone, and metro.

K 2. Staffing. This has two aspects

1. Assignment of jobs in an operation. This is a matter of assigning the personnel available to the supervisor and it occurs throughout the organization.

2. Assignment of personnel to units. This is a matter of allocating available personnel strengths to the units involved in an operation. This decision is made whenever two or more units operate under one superior and competing requirements occur. The designation of the personnel to be assigned to each unit depends on nomination by the losing unit and acceptance by the gaining unit except that disagreements are decided by the superior.

K 1.3.4. Resource Control. The decisions here are (1) the uses to which resources can be put and (2) the quantities that may be used. They involve judgement as to the relative priority of competing demands. The resource control decision tends to control the decision as to whether an operation will be performed. Therefore, the resource control decision would

preferably be located where the decision between competing activities would be made. The control decision requires information as to the availability of resources and it would preferably be located where supply decisions would be made.

#### Area Operations

All Area Operations. Decisions are required for area operations in two situations (1) when the forces are at the work place and (2) when the forces are at the assembly place. When the forces are at the work place, all decisions as to the operation being conducted there must be made there. The forces on the ground are best informed about the conditions there and thus are best situated to decide what to do there when to do it, and who will do it.

When the forces are at the assembly place, the decisions as to whether forces will be sent to which site, who will go and by what route, and generally what will be done there must be made at the assembly place. This seems to indicate that a section should be defined as the area served from an assembly place.

F 3.1. Strategic Moving. This operation would involve the whole metro area -- and possibly more -- either in moving from or in moving to. Therefore, the decision as to starting the move would have to be made at metro. For the most part, the move would be performed in accordance with a plan. The decisions to be made during the move would be chiefly in response to unforeseen events -- e.g., blocking of a designated route -- that would require deviation from the plan. These decisions would be made at the site or at section depending on where the forces to take the corrective location were located.

F 3.2. Tactical Moving. The decision situation here is the same as for strategic moving.

#### Decision Alternatives.

From the viewpoint of the requirement for and availability of information, the alternatives for locating decision authority are few. However, these alternatives do present good examples of how the consideration of alternatives leads to consideration of operating practices.



K 3.3. Remedial Moving. In the emergency, a remedial movement would be made chiefly for one of three reasons

- a. because no other solution is preferable for an internal shelter problem,
- b. because uncontrollable fires render continued occupation of shelters -- or other facilities -- infeasible, or
- c. because the hazards have subsided and the people may leave temporary housing to go to their homes.

The last of these does not pose a significant civil defense problem and need not be considered here. The other two have two critical considerations in common:

1. Destination. A movement of people in any of the first three conditions could not be judged "remedial" unless the people had a designated destination. Aimless moving could subject the people to a far worse hazard than the one they were fleeing. The destination decision would require information as to

- a. the number of people to be moved -- this would be available at the section of origin, and
- b. the location and capacities of suitable facilities -- this would be available at each section where such facilities were available.

2. Route. Similarly, a route decision would be required and it would require information as to

- a. locations of origin and destination -- this would be available where the destination decision was made;
- b. debris and radiation conditions on possible routes -- this would be available at each section thru which the move would pass; and
- c. the mode of moving: on foot or in transport -- this would be available in the section of origin.

Then, the decision to move could be made at section on y if the origin and destination were in the same section. Given that facility and route information could be passed up to zone and metro respectively, the decision to move could be made

- a. at zone, when origin and destination were in different sections of the same zone, and
- b. at metro, when origin and destination were in different zones.

What the decision would have to encompass at zone or metro would

depend on how the move was to be controlled. The control can be performed in two alternative ways

- a. forces of the section of origin control the move from origin to destination, or
- b. forces of each section involved control the move within their section.

In the first of these, information as to the specific locations of the reception facilities and as to details of the route would have to be known at the section of origin when the control forces were dispatched from the MSA. In the second, only the section of destination would need to know the specific locations of the reception facilities and each section involved would need to know only the location of the points where control would be transferred and route details within its own territory.

In the first of the control alternatives, zone or metro would need full information as to origin, destination, and route conditions in order to be able to issue competent instructions should the decision be to move. In the second, zone or metro would need to know only:

- a. that suitable facilities of sufficient capacity were available in the section of destination,
- b. the available routes in each section involved, and
- c. the general radiation situation in the sections involved.

Thus the second control alternative would appear preferable.

Given adoption of the second control alternative, the decision as to a remedial movement would encompass

- a. as to destination: identification of the section of destination and
- b. as to route: the check points at which control would be transferred and the approximate meeting times.

Then the section of destination would decide as to the specific reception facilities and each section would decide as to the route within it between check points.

In the third case -- leaving shelter -- the general destination decision -- i.e., the section of destination -- would be a part of the housing-feeding-welfare services plan.

F 10.1. Medical/Collecting. The decision problem here relates to moving people to medical facilities after the movement to shelter. In many respects it is similar to the remedial moving problem. However, it tends to be less difficult because the medical facilities would be limited in number and their locations known. In this case, the decision as to which medical facility would be the destination would depend on (1) available capacity and (2) route distance and difficulty. It would not be necessary for the destination decision to be made for every ambulance trip. It would be necessary only to advise the sections from time to time as to which medical facilities had available capacity. Then the destination decision could be made at section.

The move decision would necessarily be more complex unless there were a medical facility in each section. With a medical facility in each section, the route decision could be made at section. This would be preferable but it might not be feasible. In that case, "standard" routes could be established that would be generally be defined by checkpoints at the boundaries of sections. At these check points, the ambulance driver could be informed as to details of the route through the section. Locations of the check points could be decided at zone, and details of the standard routes within the section at section. Establishment of these standard routes would simplify the route decision in remedial moving as well.

K 1.3.1 Support. Support, as the term is used here, means the sending of operating units to assist other operating units. It involves the following decisions:

1. Whether to request. This would be made first at the site or at section depending on whether the forces were at the work place or being dispatched from the assembly place. It would be made at section or zone whenever requirements exceeded available capabilities within their respective territories. It would be made at metro when outside support was desired.

2. Whether to send support. This decision would depend on having information as to the availability of uncommitted operating capability. Uncommitted here means (1) not employed, (2) ready to operate, and (3)

not needed for any foreseeable operation. This would be known at section. Then, if the support decision is to be made at zone or metro, this information would have to be passed up from section.

3. Source and destination. Given standard routes as in F 10.1, Medical/Collecting, the decision as to source need specify only (1) kind and number of units and (2) section of origin if the decision is made at zone or zone of origin, if at metro. In either case, the designation of the units to be dispatched would be made in the section of origin -- preferably by the service chief whose units are to go.

The decision as to destination would depend on operating practice. The units could be dispatched directly to the work place or they could be sent first to the zone of destination, then to the section, and then to the work place. The second practice seems preferable. It would reduce the amount of information needed to be passed up to zone and metro and it would help to establish internal authority.

K 1.3.2. Supply. In this discussion, it is envisioned that supply would be operated in conjunction with the MSA. Units at the MSA would draw supplies from the warehouse there. Supplies required at the work place or site would be delivered by the supply service. It is also envisioned that K 1.3.4, Controlling Resources, would be activated no later than when the decision to achieve maximum readiness was made. This control would operate whenever the supply service issued supplies.

Then, supply for operations within a section would be controlled by section within the limits of its authority. When the requirements exceeded availability within a section, zone would decide the source of additional supplies within its resources and metro, if the requirements exceeded availability within zone.

To make this decision, zone and metro would need to know only the availability of supplies and the estimated requirements in each of the sections. Then, the implementing instructions for a decision to supply would need to contain only

- a. identification of the source section and the quantity, and
- b. identification of the destination section.

Delivery would be made by the source section to the destination section

warehouse over standard routes.

K 1.4. Establishing Facilities. A facility would be established in the emergency operating situation

- a. to replace a facility that had to be abandoned, or
- b. to fill a need that existing facilities cannot.

The decision to replace a facility would be made in conjunction with the decision as to a remedial movement. It would be the decision as to available facilities as a destination for the move. Therefore, the decision to establish a facility would be made wherever the specification of destination would be made: at the receiving section.

The decision as to establishing a new facility would depend on the availability of buildings, staff, utilities, and so on. It would also depend on judgements as to whether it should be a temporary expedient or the core of a more-permanent installation. It would involve considerations as to moving, e.g., patients to a medical facility or service units from an MSA to work places. These considerations seem to be beyond the capabilities at section especially with respect to work load because section would be busy with operations. Therefore it appears that the decision to establish a new facility would preferably be made at zone or even at metro.

K 3.3. Remedial Moving vs. K 1.3.1. Support or K 1.3.2. Supply. In the discussions of decisions in remedial moving, support, and supply, they were treated in isolation; i.e., as though no other considerations need apply. However, remedial movement has a contingent relationship to sheltering especially with respect to support or supply of the shelter. Therefore, when considering sending support or supplies to a shelter, section always has remedial evacuation as an alternative. When the decision can be made at section and is, the matter is settled no matter what is decided. But, if section must go up to zone, there remains the choice of

- a. to request support or supplies,
- b. to request remedial movement, or
- c. to request zone to decide between support or supply vs. remedial movement.

If section decides on either a. or b., the other and c. are precluded

and zone can decide only on the request that comes up. But, if section requests c., zone must decide whether to send support or supplies or to order the remedial movement. The same situation could exist between zone and metro.

#### CONCLUSION AS TO LEVELS OF MANAGEMENT

It seems, then, that the following levels of management of local emergency operations would be appropriate:

- a. Metro, in any event.
- b. Zone, when the metro area exceeds the established limits for a zone.
- c. Section, in any event.
- d. Site, in any event.

#### COORDINATING DECISIONS

In the preceding, a number of the decisions discussed involved more than one service. Naturally such a decision would be made by an executive who was not of any of the services. But this raises the question of who does the planning that should precede the decision and who should promulgate it after it is made.

The planning could be done in several ways, the more common of which are:

- a. by a staff unit whose assigned function is planning and whose expertise is chiefly in planning and
- b. by a committee, either standing or ad hoc, composed of representatives of the services and this includes a "staff" consisting of the chiefs of the services.

Of these two, the staff unit is preferable over the committee. Committees work well in legislating -- forming policy; they do not work well in executing policy.

#### STAFF

It was seen in Chapter II that there are two kinds of "staff:"

- a. staff, those who assist an executive in the performance of his supervisory and executive functions, and
- b. special staff, those who provide advice to an executive, his staff, or his subordinates on a subject that requires specialized expertise.

The planning unit discussed above would be staff as defined here. It

appears, then, that a staff unit should be established wherever coordinating decisions were to be made and the work load -- in the decision process -- would exceed the capacity of the executive. This would be at section, at zone and at metro.

#### Staff Functions.

The functions to be performed by the staff are the controls less those that have been assigned to the services:

K 1.1	<u>Assigning Authority</u>	K 3	<u>Informing</u>
K 1.2	<u>Staffing</u>	K 4	<u>Deciding</u>
K 1.3.1	<u>Support</u>	K 5	<u>Commanding</u>
K 2	<u>Planning</u>		

of these, K 2, 3, and 5 are the more significant -- K 4 would be done by the executive in person and, if planning has been properly done, without needing help.

Planning has been defined and described earlier on in this chapter. It was concluded above that a unit should be established for this operation.

In the discussion of planning, it was seen that information was a necessary input. Without information, planning would be neither necessary nor possible. Most of the needed information for planning would be obtained as data from units of the services either at site or at section. These data must be validated and assembled into the proper form if the information is to serve the planning need. Thus there should be an information unit whenever there is a planning unit.

Once a decision is made it must be promulgated; i.e., instructions must be prepared and communicated to those who need to know in order to carry out the action decided on. These instructions can be issued in several ways:

- a. The commander can prepare and issue them himself, either orally or in writing.
- b. They can be prepared for implementing each alternative proposed for selection, and those issued for the selected alternative.
- c. They can be prepared by staff numbers after the decision and issued for the executive.

When the instructions are not complicated or extensive, the executive can prepare and issue them himself. But if they must be extensive



or complicated he could use help. Preparing instructions in advance for each alternative would waste effort and, in addition, the executive may have his own preference as to how to implement the decision. Therefore, it would seem preferable for the staff to do the detail work of preparing and issuing instructions to reflect the desires of the executive.

Assigning authority and staffing are largely matters for decision. Insofar as the executive need be concerned they can be handled in the normal decision process.

Figure 4.6 is a revision of Figure 3.11 to include the functions assigned to the staff.

		SERVICE				
		Shelter	Fire	Police	Medical	Resource
TYPE OF OPERATION	Point	F1 F11 F12 F15	F6.1.1.1 F6.1.1.2 F6.1.2.1		F5.2.3 F10.2.2.2	F5.1.1 F5.1.2 F9 K1.3.4 K1.4
	Area		F6.1.2.2 F6.2.1 F6.2.2	F3 F4 F7 F10.1	F5.2.1 F5.2.2 F10.2.1 F10.2.2.1	F5.1.3 F5.3 F13 K1.3.2 K1.3.3

Fig.4.6 TENTATIVE ASSIGNMENT OF OPERATIONS

## V. STRUCTURE OF THE ORGANIZATION

In the preceding analysis, two characteristics of the structure of the local civil defense emergency operating organization have been established as desirable:

1. Services: to assign operating activities to
  - a. Five services: shelter, fire, police, medical, and resource.
  - b. Headquarters
  - c. Staffs
  - d. Individuals
2. Levels of Management: to establish four levels of management:
  - a. Site (the work place)
  - b. Section (if MSAs are established)
  - c. Zone (if the locality is large enough)
  - d. Metro.

The next matter to be examined is: which of the services should be established at each of the levels. This requires consideration of

- a. The area served by the service.
- b. The type of operation: point or area.
- c. The preferred location of decisions affecting operations of the service.

### ORGANIZATION ELEMENTS AT SITE

#### Shelter Service

1. In Shelter. The individual shelter serves its immediate site and all decisions affecting its internal operations are made there. A unit of the shelter service would be established there.

Because it might have to operate independently, each shelter would have to be able to perform all of the civil defense operations that were appropriate within it. It would be appropriate, then, to establish a unit of each of the services in the shelter organization. In addition -- especially, in the larger shelters -- there would be a need for a staff unit to perform staff functions especially with respect to information.

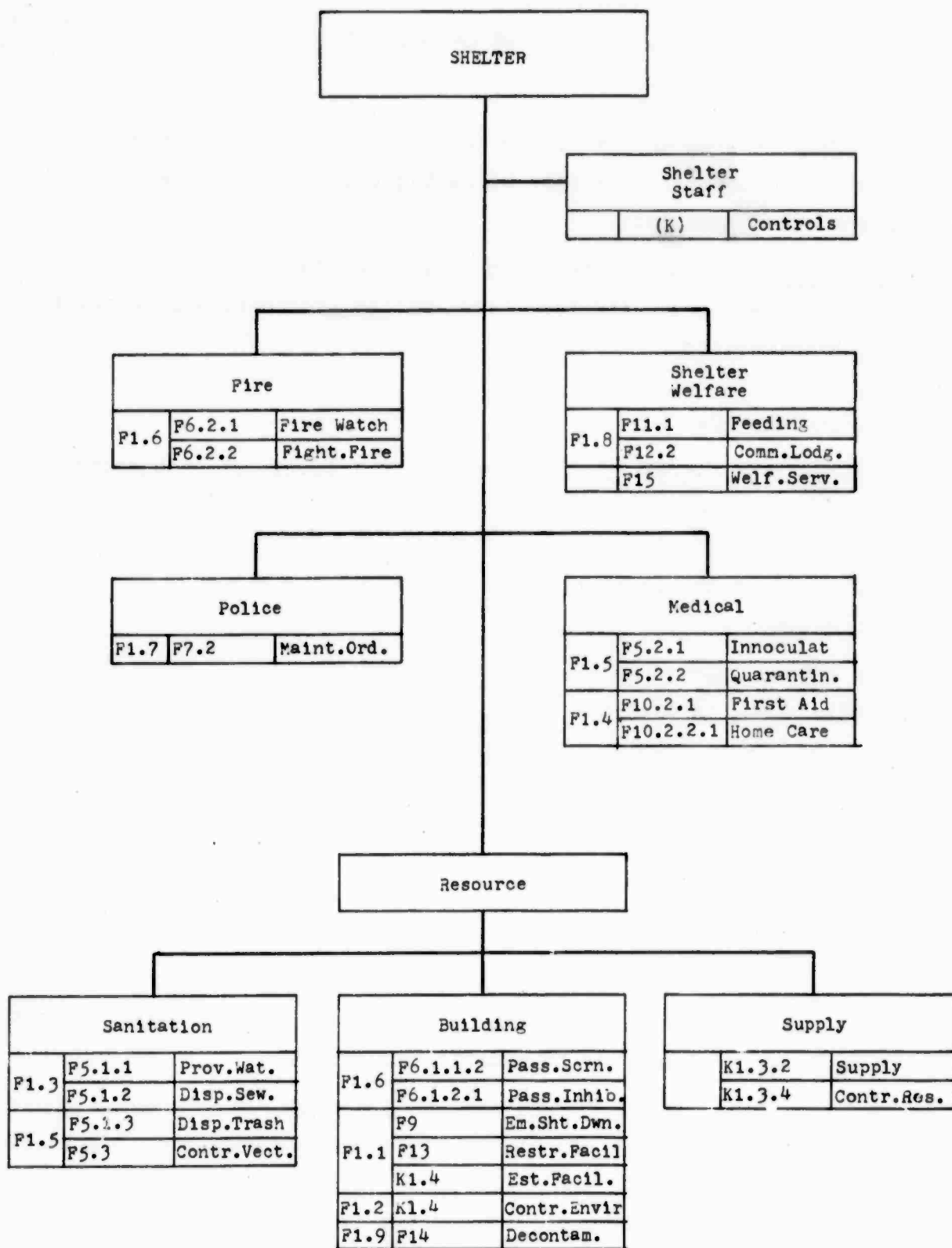


Fig.5.1 ORGANIZATION OF THE INDIVIDUAL SHELTER

Figure 5.1 shows an organization chart for an individual shelter with operation assignments. Shelter operation codes (first column) are related to general system operation codes (second column). These service units would operate as on detached service in a task group whose overall mission would be to operate the shelter

In the event that a number of shelters were located close together, it might be advantageous to group them into what has been called a "shelter complex." In this the group of shelters would be operated as one shelter, with an overall command and one staff. This could have a number of advantages, e.g.:

- a. Avoiding duplication of command and staff positions would make staffing easier.
- b. Such in-shelter operations as balancing shelter loading, use of supplies, assignment of skilled personnel, etc., could be accomplished by internal coordination rather than by cooperation or reference to a higher headquarters.
- c. The need for facilities for communicating with higher headquarters and the use of such facilities should be reduced.

In organizing, the shelter complex would be treated as a single shelter.

2. After Leaving Shelter. After the people left the shelters, the shelter service would perform two sets of operations. These sets are alternatives in a given area but might be performed in different areas at the same time. The alternative between the groups lies chiefly in the method of housing. Both sets would include F 15, Welfare Services.

a. Billeting. When the people are billeted -- i.e., housed in private homes, food would be distributed for preparation and serving there. Then, there would be requirements for:

- (1) An office in which to assemble information as to availability of billets and from which to assign billets to them.
- (2) An establishment from which to distribute food for those in billets.
- (3) An establishment in which to perform welfare services.

These establishments would serve the same people. Therefore, it would be more efficient and more desirable -- at least for the people -- if these operations were performed at the same place or in places that were close together. It would seem desirable, then, to establish a shelter service group with subordinate units to perform each of the

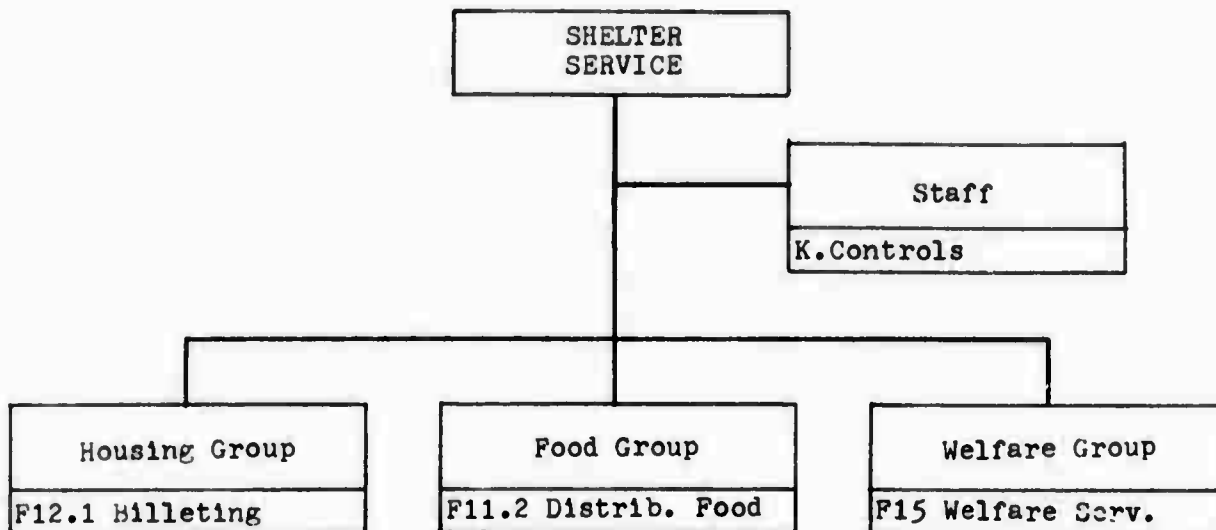


Fig.5.2b. SITE ORGANIZATION FOR SHELTER SERVICE  
(Billeting)

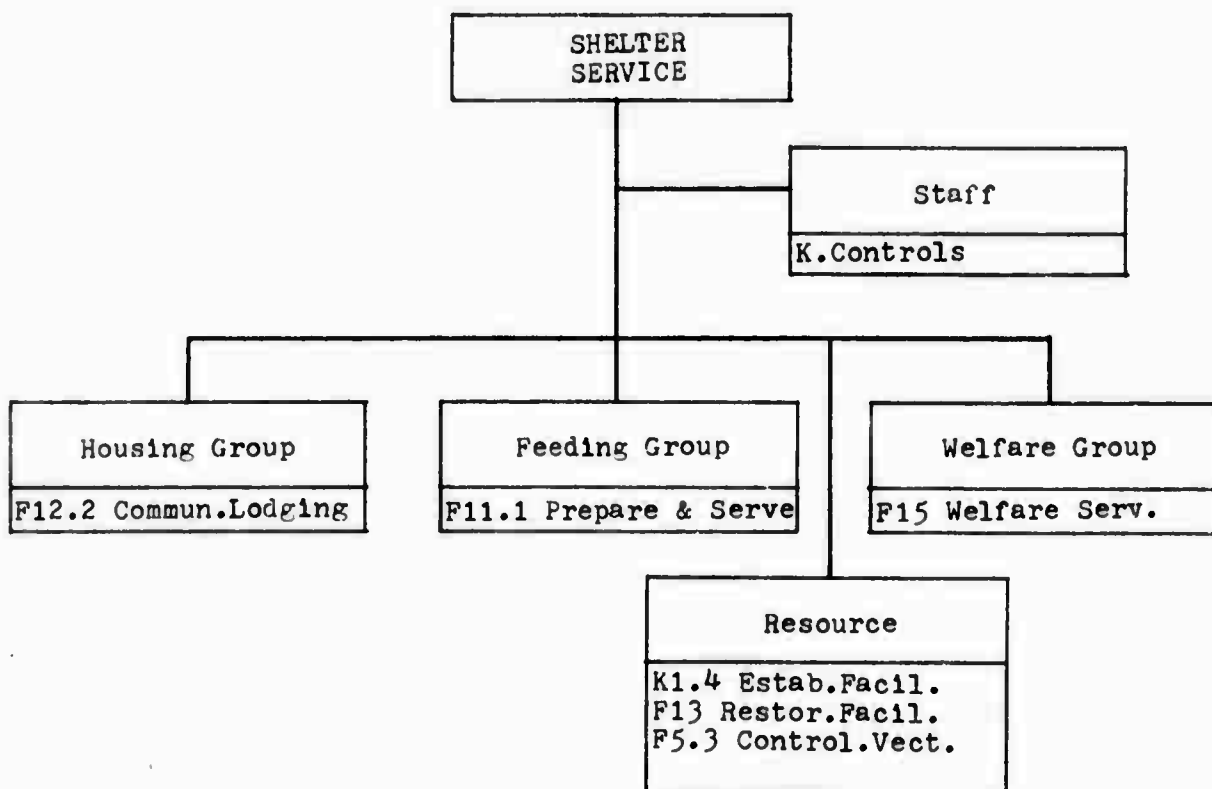


Fig.5.2a. SITE ORGANIZATION FOR SHELTER SERVICE  
(Community Lodging)

three operations.

b. Community Lodging. When people are housed in large groups, food would be prepared and served to them. Then there would be requirements for

- (1) An establishment in which to lodge the people.
- (2) An establishment within which to feed the people.
- (3) An establishment in which to perform welfare services.

It would be preferable that these establishments be in the same facility or, if that is not feasible, in facilities that are close together.

Again, then, it would appear desirable to establish a shelter service group with subordinate units to perform these operations. In addition, a unit of the resource service would be needed to operate the facility. This will be discussed later on.

Figure 5.2 shows the alternative organizations for these two situations and the assignments of operations.

#### Fire Service

Two of the point operations tentatively assigned to the fire service in Chapter III are: F 6.1.1.2, Passive Screening, and F 6.1.2.1, Passive Inhibiting. Neither of these requires special fire fighting skills; both can be performed by those who maintain the facilities -- including householders -- given some advice and guidance. Giving this advice and guidance would be a metro-wide service in the crisis situation. Therefore, there does not appear to be any need for a unit of the fire service at the site to perform these operations. On the contrary, it would seem more logical to assign these functions with K 1.4, Establishing Facilities, to the resource service for system facilities.

The observation of fires in F 6.2.1, Fire Watching, would be performed largely at the site although it is an area operation. Whenever site conditions rendered a mobile watch undesirable, a point watch might be preferable. But there would likely be people at any site where a point watch would be needed. To establish a unit of the fire service at such a place would be unnecessary if there were communications and useless if there were not. But if a requirement for a point watch by the fire service should arise, it could be staffed by a member of the

fire watch service detached from the unit based at the MSA.

In the event that the MSA was at some distance from a high-value facility and it was considered that debris clearing operations might not be effective enough to assure fire protection, it might be desirable to pre-position a fire unit there. However, it would not be necessary to include the fire service unit in the organization of the facility. It would operate as attached to the fire service at the MSA.

Police Service. The police service would perform its F 7.2, Maintaining Order, operation at some facilities -- medical or community lodging, for example -- where a sizeable force might be required. This unit might be detached from the MSA and attached to the facility organization. However, this would limit flexibility in employing available personnel. Therefore, it appears preferable to staff this operation by dispatch of guards from the police unit at the MSA.

Medical Service. The medical service would perform two point operations: F 5.2.3, Isolating, and F 10.2.2.2, Facility Care. These differ only in that in isolating the facility is quarantined. They are traditionally largely independent operations; i.e., each facility operates independently. Therefore, a unit of the medical service would be established at each of these facilities. In addition, if the medical facility did not have a facility operating unit in its normal organization, a unit of the resource service would be needed for this purpose.

Resource Service.

The resource service was assigned three sets of point operations.

1. Water and Sewage Plants. These are isolated operations that traditionally are independent. They would be organized as separate units of the resource service. No other unit of the resource service would be needed for facility operation at these plants.

2. Establishing Facilities. The operations to be performed in setting up, operating, and maintaining facilities would be required at each facility. Whether a unit of the resource service would be required would depend on

- a. Whether the work load would be large enough to warrant a separate unit, or



- b. Whether the facility already had such a unit in its normal organization.

If the facility were large enough and did not normally have such a unit, a unit of the resource service could be established there. Smaller facilities could be served by mobile teams from the MSA.

3. Controlling Resources. This is a point operation but it is closely associated with K 1.3.2, Supply. Therefore, a unit of the resource service would be established wherever there was unit of the supply service that issued or directed the issuance of supplies.

#### ORGANIZATION ELEMENTS AT SECTION

For this study it has been taken that section has a 1:1 correlation with MSA and assembly place in the sense that section is the organization element that would manage operations at the MSA or assembly place and throughout the section of a zone served from the MSA.

#### Shelter Service.

All of the operations assigned to the shelter service that serve the people directly would be performed at the site. Any operation involving the shelter service and any other would involve coordination that could not be performed by any of the participating services. Thus, there does not appear to be a requirement for units of the shelter service other than at site from that point of view. However, requests for support or supply coming from a large number of individual shelters or housing and feeding establishments would impose a large internal communications and coordination load at section. Therefore, it would seem desirable to establish a unit of the shelter service at section for this purpose.

#### Fire Service.

The area operations assigned to the fire service fall into two sets that differ.

1. Fire Fighting. This includes F 6.1.2.2, Active Inhibiting, and F 6.2.2, Fighting Fire. These operations are much the same, differing only that the first is applied to facilities that have not ignited, the second, to those that are burning. They employ the same skills and equipment generally at the same place, at the same time.
2. Fire Watching. This differs from the other two because it does

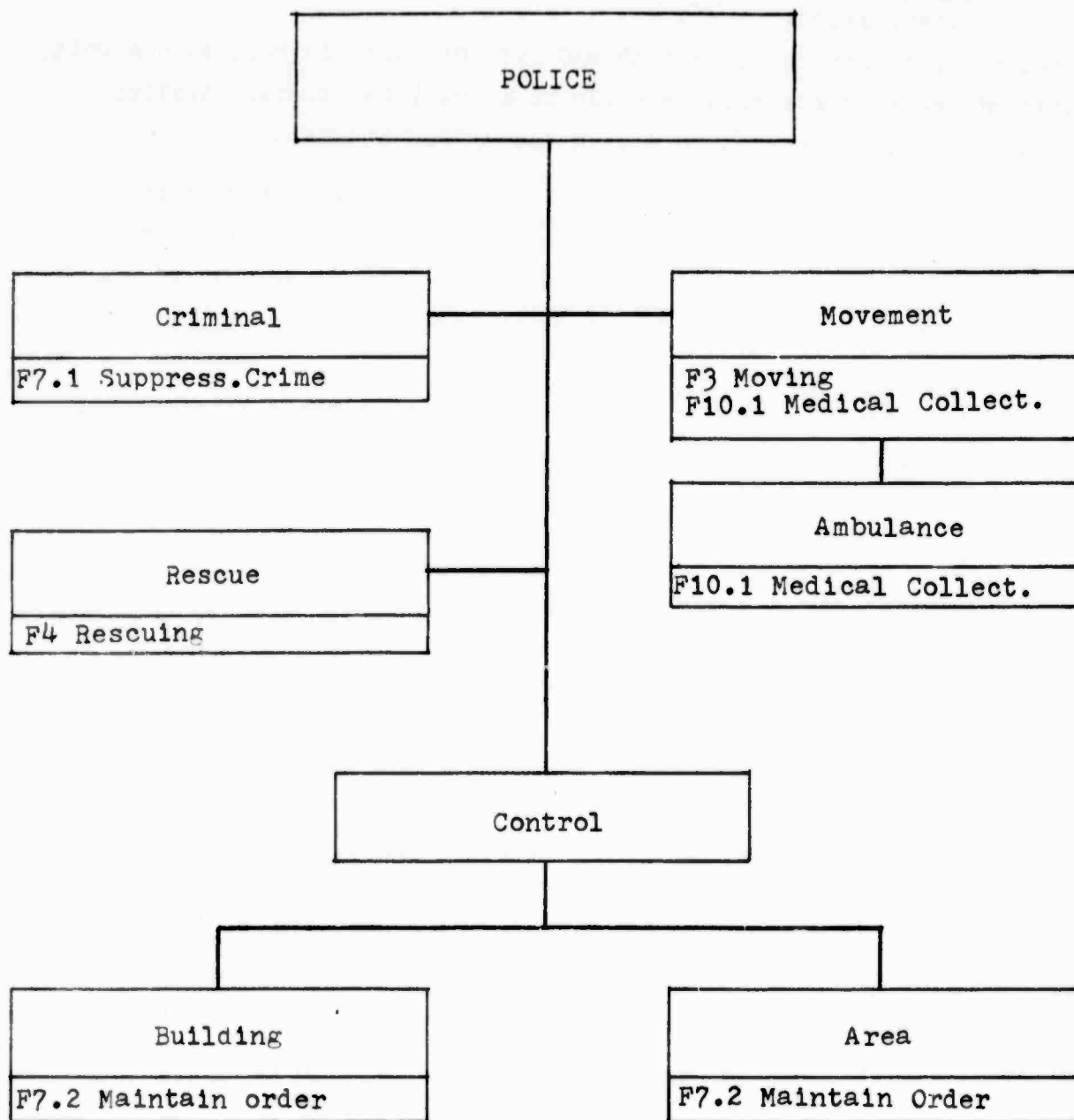


Fig.5.3 ORGANIZATION OF THE POLICE SERVICE

not require the same skills or equipment and would need to precede the others.

Both sets would operate from the MSA. Therefore, it would seem desirable to establish a fire service group at section with a subordinate unit for each set of operations.

#### Police Service.

The police service is assigned area operations that fall into three sets.

1. Movement. This set contains two related operations: F 3, Moving, and F 10.1, Medical/Collecting. Both have to do with moving people, often from the same place or at the same time. F 3, Moving is largely a matter of planning and commanding with control of the movement supplied by F 7.2, Maintaining Order and transport, by K 1.3.3, Transport. F 10.1, Medical/Collecting, is similar except that it would employ its own transport with support by K 1.3.3, Transport. It would seem appropriate to establish a movement unit of the police service with a subordinate ambulance unit.

2. Rescuing. This operation is different from the others assigned to the police service. A separate unit would be logical.

3. Police. The third set of area operations assigned to the police service are the traditional F 7.1, Suppressing Crime, and F 7.2, Maintaining Order. They are different. The first is characterized by detectives and patrolmen; the second, by building guards and traffic policemen. Throughout most of the emergency the requirement would be chiefly for maintaining order. This would be of two kinds: (1) at the site of outdoor operations such as moving or fire fighting and (2) in facilities such as for feeding or medical care. Therefore, it would seem logical to establish two units of the police service

- a. Criminal for suppressing crime, when required.
- b. Control for maintaining order; this to be subdivided into two groups
  - (1) Building, to serve in facilities, and
  - (2) Area, to serve outdoors.

Figure 5.3 shows the organization of the police service at Section.

### Medical Service

The area operations assigned to the medical service fall into two sets that are much more alike than those discussed above but operate in different situations.

1. Mobile. This set includes F 5.2.1, Innoculating, F 5.2.2, Quarantining, and F 10.2.2.1, Home Care. All of these operations would serve people not in medical facilities and would be performed largely by the same personnel, in the same place, and, at the same time. While the people were in shelter, Innoculating and Home Care would operate only in support of the shelters, logically from the MSA. After the people left the shelters, it might be more desirable to operate them from a medical facility because of the improved ease in providing reciprocal support. Therefore, it would seem appropriate to establish a medical service at section to operate from the MSA in the in-shelter period and, possibly, from a medical facility after people left the shelters.

2. First Aid. This operation -- F 10.2.1, First Aid -- is different from the others in that it would ordinarily operate in conjunction with such non-medical operations as fire fighting or rescue. It would be appropriate to establish a unit of the medical service at section for this operation.

For reasons similar to those discussed for the shelter service, it would also seem desirable to establish a unit of the medical service to consolidate requests for support and supplies from medical facilities located in the section although these facilities would operate independently.

### Resource Service.

The resource service is assigned three sets of area operations.

1. Sanitation. This set has two operations: F 5.1.3, Disposing of Trash, and F 5.3, Controlling Vectors. These operations are different but they are commonly assigned to one element of local government -- e.g., a department of sanitation -- because they are related: disposing of trash is a way of controlling vectors. Therefore, it seems logical to establish a unit of the resource service at section for them with a separate subordinate unit for each.

While the water and sewage treatment plants would operate independently, they would need to be attached to the appropriate section for support and supply. These plants are also commonly assigned to a department of sanitation -- or its equivalent -- in local government. Therefore, it would be logical to assign the servicing of the water and sewage treatment plants to the sanitation unit of the resource service.

2. Facilities. Two kinds of operations are involved in making facilities available for use:

- a. Cleaning. F 13.1, Clearing Debris, and F 14, Decontaminating, restore access to the facilities. They apply chiefly to streets and associated spaces and are concerned with cleaning the environment.
- b. Maintenance. F 13.2, Repairing and Replacing, makes facilities usable after access to them has been achieved. This operation applies both to buildings and to streets and associated facilities.

In the larger part of the work, the skills and equipment required for maintaining buildings differs from those required for cleaning and for maintaining streets.

The building operation units at site facilities could also benefit from representation at section for support and supply much as shelters and medical facilities. This task could be assigned to the building maintenance group because the support required at the site would usually be in the form of repair assistance.

It seems logical, then, to establish a unit of the resource service at section for operation and maintenance of facilities with a subordinate unit for streets and another for buildings.

3. Service. The resource service is assigned two operations that serve almost all other operations: K 1.3.2, Supply, and K 1.3.3, Transport. These are closely related to each other because -- in the concept of operations used here -- supply would deliver and thus be a major user of transport. It was seen earlier on that controlling of resources would be performed at every place from which supply operated. Therefore, it appears desirable that a unit of the resource service be established with subordinate groups for supply and transport. When the supply warehouse is at the MSA -- and this is desirable -- the supply group at

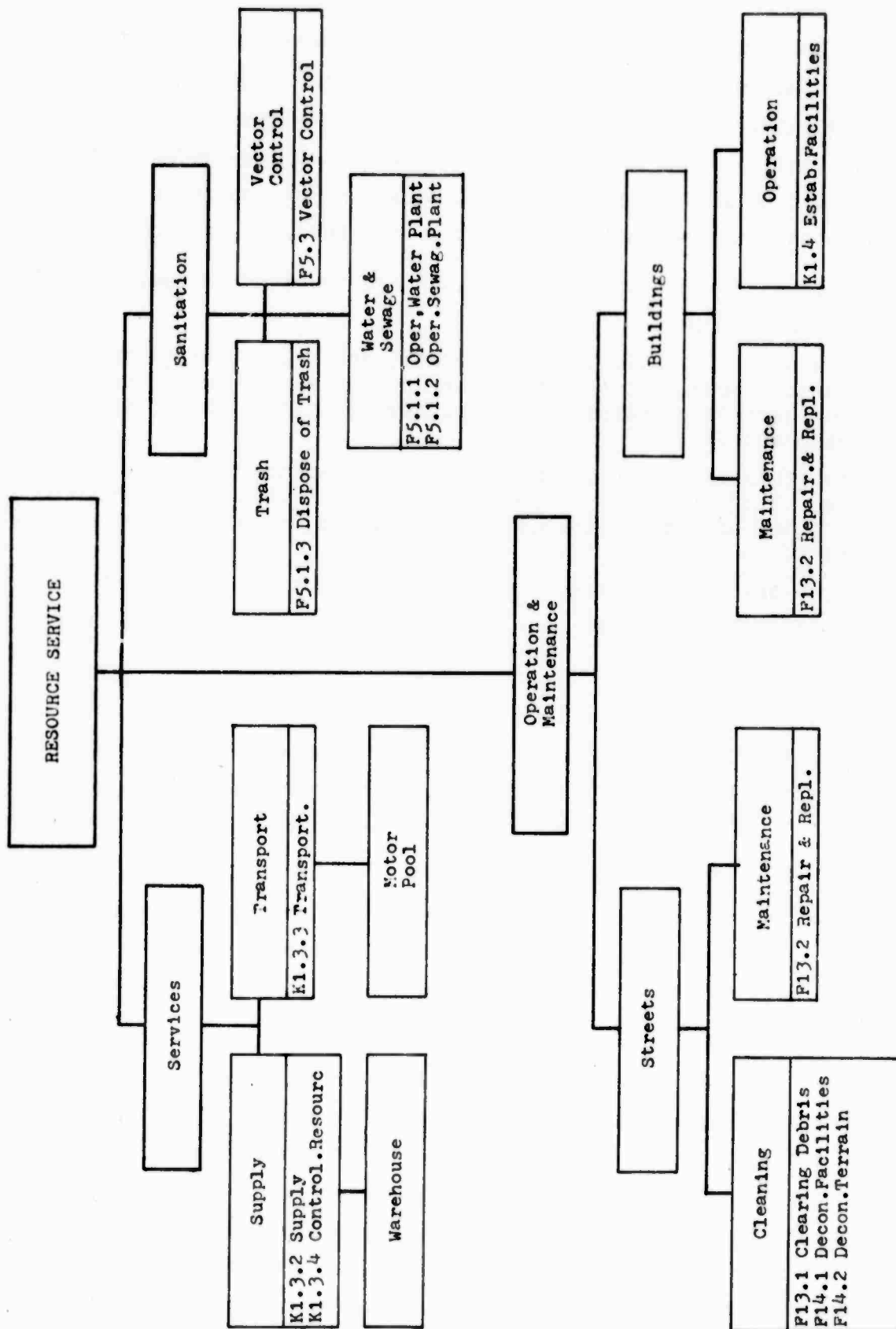


FIG. 5.4 ORGANIZATION OF THE RESOURCE SERVICE

section would operate it. If, however, it were separated at some distance, there would need to be an operating group at the warehouse and a service group at section.

The organization chart for the resource service at section is shown in Figure 5.4.

#### Staff.

Most of the emergency operations involving more than one service would be performed within the section and would involve forces dispatched from the MSA. It seems, then, that a planning unit should be established at section.

Forces operating from the MSA -- whether the operating services or an information service -- would be the principal source of data about site and system conditions. Data about people and site and system conditions at point operations could be reported to their service units at section. Data about the availability of supplies and transport would come from the Resource Service group at section. Section, then, would be the major assembly point for the data necessary for operations, except of course, for forces at the work place. Section is also the place where the major requirement for information for operations would be, again, except for the work place. It would seem logical, then, to establish an information center at section to process the data into the required information.

The operations to be mounted from the MSA would tend to be complex; i.e., to involve a number of services. Therefore, it would seem desirable to provide staff assistance to the executive to assist in preparing instructions.

These three units would all perform what are taken to be staff operations. Therefore, a staff group should be established at section with units for planning, information, and operations.

#### Administrative Services

Any operation of the scope and size of the MSA would be more efficient when the requirements that the operating services have in common were provided in common. In the case of the MSA this would include: communications, housing, feeding, office supply, and so on. Therefore,



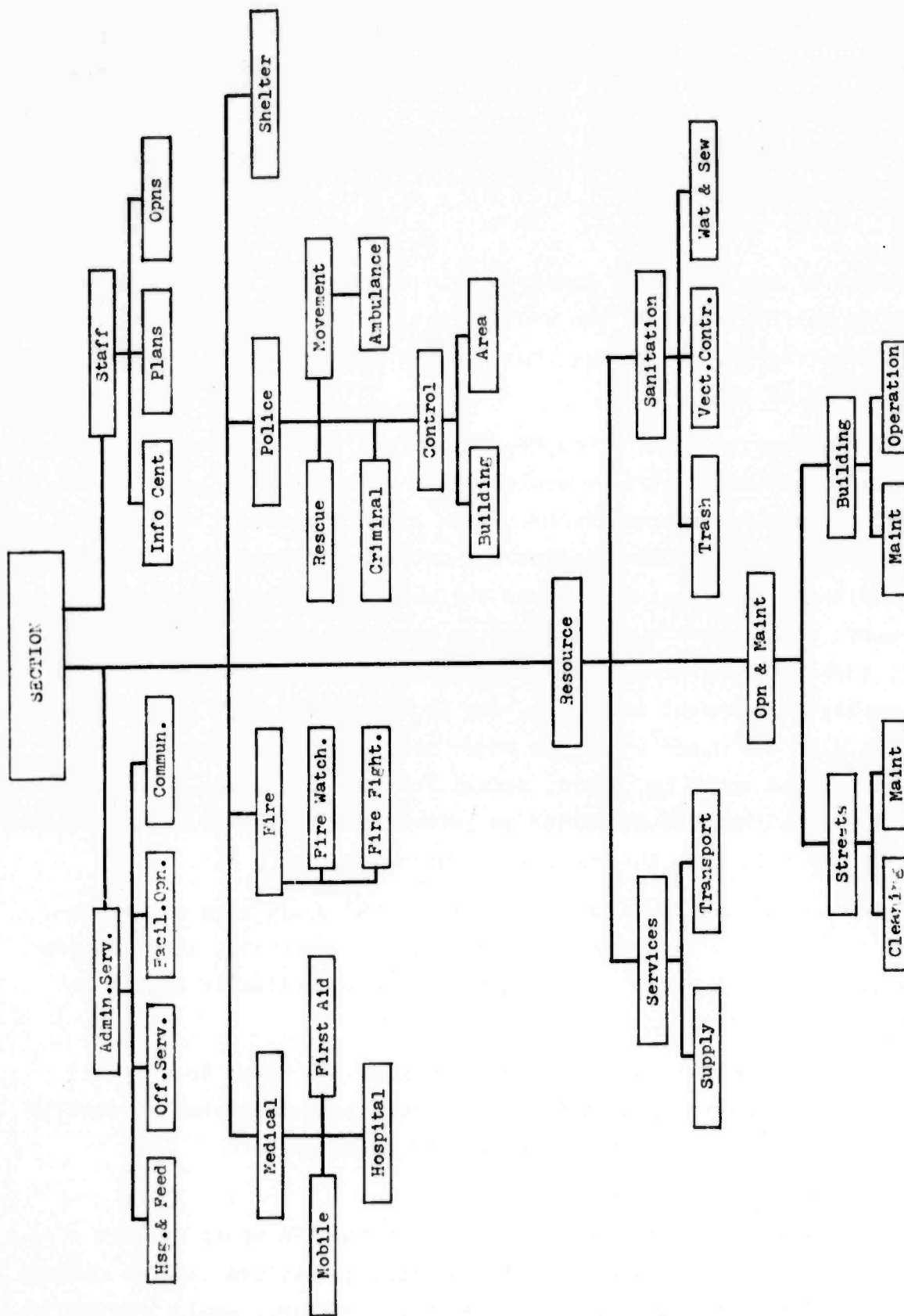


FIG.5.5 ORGANIZATION OF SECTION AND MSA

it would seem appropriate to establish an administrative services unit at section to provide such services. It would also be appropriate to attach the building operations unit for the MSA to this administrative services unit.

#### Organization Chart for Section

The organization chart for section is shown in Figure 5.5.

#### ORGANIZATION ELEMENTS AT ZONE

All field operations are conducted at site and section. However, not all problems can be solved there. Therefore, it is necessary to examine what elements of the organization should be established at zone.

#### Shelter Service.

Any requirements for support or supply of the shelters or of housing, feeding, and welfare services would be consolidated at section and filled there if the resources were available. A request from section to zone for support or supplies would be an action of the executive at section. Therefore, there does not appear to be a requirement for a unit of the shelter service at zone.

#### Fire Service.

There does not need to be a requirement for a unit of the fire service at zone for reasons similar to those discussed for the shelter service.

#### Police Service.

Again, there would be no need for a unit of the police service for rescue or control operations. There would be a need for a unit to coordinate crime suppression activities, but this requirement would most probably not arise until the people had left the shelters and this unit could be activated at that time.

Movement of the people to shelter -- F 3.1, Strategic, and F 3.2 Tactical, could require some coordination at zone and it might be desirable to have a unit of the police service at zone for them until the movement to shelter was complete. However, if F 3.3, Remedial Moving is operated as discussed in Chapter IV, the planning staff at zone could do the necessary job. Any required police judgement would be

applied at section where the information would be produced. At zone, the job of deciding destination and route would be largely mechanical. The method of operating F 10.1, Medical/Collecting, discussed in Chapter IV places the decision at section. Therefore, there does not appear to be a need for a unit of the movement group of the police service at zone after the movement of the people to shelter is complete.

#### Medical Service.

The only need for a unit of the medical service at zone would be to coordinate the operation of medical facilities with respect to case load. However, the method of operating, F 10.1, Medical/Collecting, discussed in Chapter IV provides this coordination by supplying information as to available capacity to section. The judgement as to capacity is applied at the individual facility where the data for capacity information originate. The information is produced at section. From there it can be handled in information channels. Therefore, there does not appear to be any need for a unit of the medical service at zone.

#### Resource Service.

For reasons similar to those discussed above there would be no requirement for a unit of the resource service at zone except for the supply group. Here the decision to supply involves not only the adjudication of competing demands but also the designation of the source of the supplies at least to the extent of identifying the section from which they are to be shipped. This requires specialized stock control expertise and, therefore, a supply unit of the resource service should be established at zone.

#### Staff.

Units of the staff would be required at zone for planning, information, and assisting the executive with issuing instructions for the same reasons as at section.

#### Special Staff.

At zone, there is a need for a special staff to advise the executive and the staff on technical matters. This need did not arise at section because all services had either operating units or their service representatives there to advise the executive and his staff. As

was demonstrated above, there is not a continuing need for units of any of the operating services at zone, except for the resource service. But the executives and his staff need -- and have a right to -- competent technical advice. Therefore, a special staff would appear desirable at zone. The head of each special staff unit would report directly to the executive. The senior resource services officer who would supervise the supply activity could also give special staff advice in resource matters and a resource service officer would not be required for the special staff.

#### Administrative Services.

An administrative service unit would be required at zone to provide the same services as at section.

#### Organization Chart for Zone.

The organization chart for the zone is shown in Figure 5.6.

#### ORGANIZATION ELEMENTS AT METRO

##### Shelter Service.

No unit of the shelter service is required at metro for the same reasons as at zone.

##### Fire Service.

Two sets of point operations that would be performed at metro were tentatively assigned to the fire service.

1. Active Screening. Activation of the active screen is related to the timing of the attack. It can be done when the warning alert is given or at some later time; it depends on having knowledge of the predicted time of arrival of an attacking weapon. In any event, the critical indicator for the activation decision is time. Therefore, it does not appear necessary to establish a unit of the fire service at metro for active screening. This operation can be performed by the same organization element that gives the warning alert.

2. Passive Screening and Inhibiting. At metro, these operations are a matter of issuing advice and guidance in the crisis situation. This information can be prepared in advance and prepositioned to be given along with whatever other information in the crisis situation. While

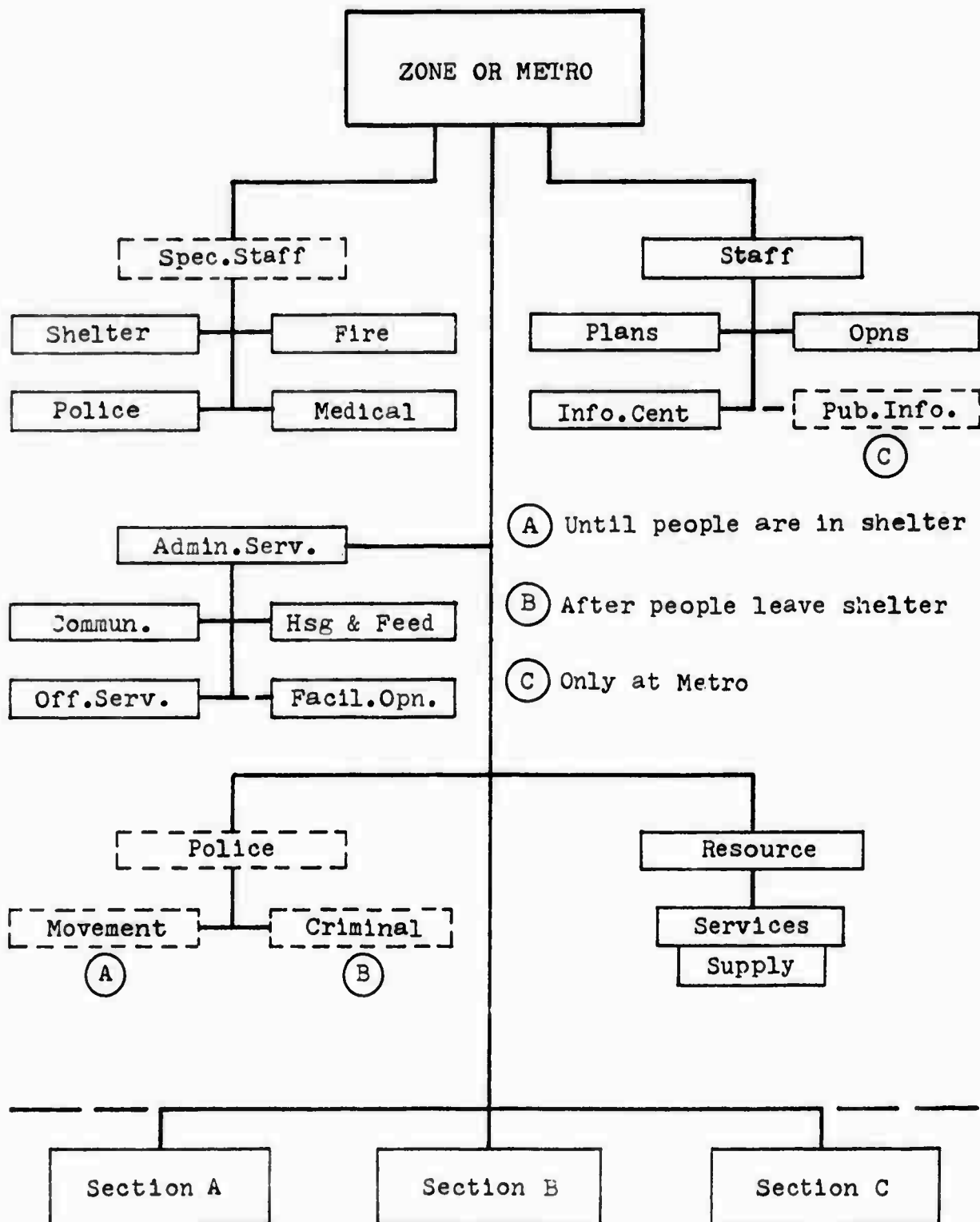


Fig.5.6 ORGANIZATION OF ZONE AND METRO HEADQUARTERS

it requires fire fighting expertise to prepare this material, it does not require that expertise to issue it. Therefore, there does not appear to be any need for a unit of the fire service at metro for these operations. They can be assigned to the unit that will perform the operation of informing the public in the emergency.

#### Police Service.

The requirements for units of the police service at metro is the same as at zone; i.e., a movement group until the people have completed the movement to shelter and a criminal activities group after the people have left the shelters.

#### Medical Service.

No unit of the medical service is required at metro for the same reasons as at zone.

#### Resource Service.

The only requirement for a unit of the resource service is the same at metro as at zone; i.e., for a supply unit.

#### Staff.

Units of the staff should be established at metro for the same reason as at zone and section. In this case, however, the staff would be charged with specific responsibility for F 2, Warning, and F 6.1.1.1, Active Screening.

#### Special Staff.

The requirements for special staff are the same at metro as at zone and its composition would be the same.

#### Administrative Services.

The requirement for administrative services would be the same at metro as at zone.

#### Organization Chart for Metro Headquarters.

The organization chart for metro headquarters is tentatively the same as for zone in Figure 5.6.

Information is an important consideration in organizing. Not only are the gathering, processing, and communicating of information duties to be assigned but the structure of the organization must also provide for the flow of information to where it is needed.

#### INFORMATION REQUIREMENTS AND AVAILABILITY

Information is required for decision. Deriving information requirements is a matter of identifying the decisions to be made, analyzing these decisions to find what the critical indicators are for each, and then analyzing the critical indicators to find what information is needed to describe the existing critical indicator.

Figure 6.1 is a sample of the first of a set of two forms that can be used in this analysis. The first column identifies a code for an event in the emergency situation. The codes refer to ALPHA NEOP and are further described in Appendix A. The second column identifies a "trigger", an event that leads to the need for a decision. Some of these events are happenings that may be observed. Others are decisions that require further decisions. At this stage of the analysis, it does not matter which is which.

The third column identifies critical decisions; i.e., decisions that start some action in the operation being analyzed. In general, a single critical decision means "yes or no;" i.e., to take the action or not to take the action. Where more than one critical decision are shown, the meaning is "yes or no" for each and also either (1) that they are alternatives or (2) that they are independent; i.e., that more than one action may be taken. For the present purpose, it does not matter which meaning applies.

The fourth column identified the "critical indicators" for each decision. A critical indicator is a summary code word or phrase for the information that must be considered in making the decision. When described qualitatively, the critical indicator describes the kinds of information to be considered. When described quantitatively, the




F13 Restoring Facilities .1 Clearing Debris			
Event	Trigger	Critical Decisions	Critical Indicators
A V	1.Decision to achieve max. readiness	1.Deploy Units	1.Assigned functions
			2.Assigned Duty Stations
			1.Opns.to be Performed
			2.Available personnel
A VII	2.Warning alert (F2.1)	1.Complete Deployment	1.Status of deployment
B I	3.Move to shelt blocked (3.2)	1.Clear Route	1.Site Conditions
			2.System Condition
D I	4.Damage or developing fire	1.Clear access routes	1.Designated Routes
			2.Site Conditions
			3.System Condition
	5.Uncontroll. fire	1.Clear routes for remed.movement	Same as (4.1)
DE II III	6.Added attack and fallout unlikely	1.Clear access routes	1.Site Conditions
			2.System Condition
			3.Hazard to Personnel
B V CDEIV	7.Added attack and fallout unlikely	1.Clear access	1.Facil.& Road.Reqmts.
			2.Same as (6.1)
		2.Resume normal operations	Same as (6.1)
		3.Redeploy personnel	1.Staffing Requirements
Any	8.Reqmt.exceeds capability	1.Acquire support	See K1.3.1.1
	9.Reqmt.exceeds avail.equip. or supplies	1.Acquire Equipment or supplies	See K1.3.2.3

Fig.6.1 CRITICAL DECISION ANALYSIS

critical indicator becomes a criterion. For example, "dose rate 40 R/hr and rising" is the critical indicator for deciding that the situation is "fallout red." "Developing fire" is "fire black". The simultaneous occurrence of the two is the critical indicator for deciding that the total situation is "80S-5, fire black, fallout red."

Figure 6.2 is the second of the set of two forms that can be used for analyzing information requirements. The function code relates this form to the first. The decision code refers to the numbering of the trigger, decision, and indicator combination in the first form. For each critical indicator, the necessary input data and other information are identified, together with such other notes as appear desirable. The items marked with a circle should be "stored" information as in a plan. Those marked with a hexagon require special skill to obtain or to interpret.

Figure 6.3 is a form for recording the analysis of information availability. It is a companion to Figures 6.1 and 6.2; the three make the complete set. The code in Figure 6.3 refers to the operation being analyzed and to the trigger-decision-indicator combination in Figure 6.1. The entries indicate data and information sources. The legend for the entries is:

-  = information source
- a = action
- d = decision (also informative)
- e = event

The circles and hexagons have the same meaning as in Figure 6.2. The primary data sources (column headings) are system operations except for "In" (Individual). This permits identification of the sources of almost all information sources because almost all of the information needed in the system is obtainable in the system. However, when information comes from outside it can be noted as to source.

These three forms proved convenient for the information requirements and availability. One set was prepared for each of the detailed operations identified in this study. There is nothing that recommends these forms over others that might be devised to suit the taste of the

Code		Other Function Involved	People		Res	Site Conditions								System				Primary Data Source		
Function	Decision		Number	Location	Condition	Avail.	Requir.	Nat.Env.				Attack Env.				Personnel	Equipment		Supplies	Facilities
								Weather	Surface	Disease	Vectors	Attack	Damage	Debris	Fire					
F13.1	1.1.1		Assignment of functions																	Op Plan
	.2		Duty stations																	Op Plan
	.2.1		Operations to be performed																	Op Plan
	.2																			
	2.1		Status of deployment																	
	3.1.1																			
	.2																			
	4.1.1		Designated routes																	K2.2
	.2																			
	.3																			
	5.1		(Same as (4.1))																	
	6.1.1																			
	.2																			
	.3																			
	.2.1		(Same as (6.1))																	
	.2		Location of hazardous																	
	7.1.1																			K2.2
	.2																			
	.3																			
	.4																			
	.2		(Same as 6.1))																	K2.2
	.3.1		Staffing requirement																	K1.2
	.2		Duty stations																	K1.2
8.1	K1.3.1.1																			
9.1	K1.3.2.3																			

Fig.6.2 INFORMATION INPUT REQUIREMENTS

Primary Data Source																										
Code		Functions															Controls									
F13.1	Indiv	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	K1				K2		K3		K4	K5
				12.3														.1	.2	.3	.4	.1	.2	.1	.2	
1																										
	1													d												
		1																								
		2																								
	2													d												
		1																								
		2																								
2			e																							
	1	d												d												
		1																								
3			e																							
	1													d												
		1																								
		2																								
4							d																			
	1													d												
		1																								
		2																								
		3																								
5														d												
	1													(same as (4.1))												
6							d																			
	1													d												
		1																								
		2																								
		3																								
	2													(same as (6.1))												
7																										
	1																									
		1																								
		2												(same as (6.1))												
	2													(same as (6.1))												
		3																								
		1																								
		2																								
8														d												
	1																									
9														d												
	1																									

FIG.6.3 INFORMATION AVAILABILITY

		INFORMATION REQUIREMENTS AND AVAILABILITY																																				
		1.Site												2.Section																								
		1.Peop				2.Hes				3.Site Conditions				4.System				1.Peop				2.Hes				3.Site Conditions				4.System								
		1.Numbers	2.Location	3.Condition	1.Availability	2.Requirement	1.Weather	2.Surface	3.Disease	4.Vectors	1.Attack	2.Damage	3.Debris	4.Fire	5.Radiation	1.Personnel	2.Equipment	3.Supplies	4.Facilities	1.Numbers	2.Location	3.Condition	1.Availability	2.Requirement	1.Weather	2.Surface	3.Disease	4.Vectors	1.Attack	2.Damage	3.Debris	4.Fire	5.Radiation	1.Personnel	2.Equipment	3.Supplies	4.Facilities	
ORGANIZATION ELEMENTS	Shelter	Shelter																																				
		Food																																				
		Housing																																				
		Welfare																																				
		Fire Fighting																																				
	Fire	Fire Watch																																				
		Movement																																				
		Rescue																																				
		Criminal																																				
		Police	Control																																			
Area Building																																						
Hospital																																						
Mobile																																						
Medical	First Aid																																					
	Water & Sewage																																					
	Sanitation																																					
	Vector Control																																					
	Resource	Building																																				
Cleaning																																						
Maintenance																																						
Supply																																						
Transport																																						
Facility Operation	Facility Operation																																					

FIG. 6.4 INFORMATION REQUIREMENTS AND AVAILABILITY

analyst. But the data involved in this analysis are so voluminous that some orderly way must be devised to arrange them for use. The analyst will also find that this information analysis yields an insight into the system and its workings that becomes the basis for almost all of the remainder of the analysis of organizing.

When the information requirement and availability analysis using Figures 6.1, 6.2, and 6.3 has been completed, the results can be summarized as in Figure 6.4. This identifies the organization units that require the several kinds of information when their forces are at the site and at section (MSA.) For example, all units of the shelter service require radiation information at the site and all units performing area-type operations require radiation information at site or at section depending on where the forces are located. Figure 6.4 also identifies major users of information -- those for whom a given kind of information is essential for operating. For example, the shelter, feeding, and housing units of the shelter service are major users of information about the numbers and locations of people.

Figure 6.4 also shows that the required radiation information is available to units performing area-type operations except remedial moving and ambulance when they are at the work place (site) but not when they are at section. In the case of remedial moving and ambulance the information is only partly available when the units are at the site. These units can know what the radiation condition is where they are but they cannot -- from their own observation -- know what it is at the destination of their move or along the route to it. Similarly, units at site -- except fire fighting units -- can observe fires but cannot decide what the fire situation is. Therefore, fire information is only partly available to them.

Figure 6.4 also identifies "best" sources of information. These are units that can not only observe the evidences that are part of the information requirement but also can decide the other parts of the required information that must be based in technical expertise and judgement in interpreting the evidence.

#### SITE INFORMATION PROBLEMS

Most information requirements at the work place can be filled there. But some requirements would have to be filled from some other source -- either from some other place, by some other service or organization unit, or by assignment of the information gathering function as a duty additional to those previously discussed.

1. People. While people are in protection, information about those in community shelter is readily available at least in the shelters. They can be counted; the locations of the shelters are known; and the condition of the people can be observed. But information about people in home basements or in refuge would not be available from any of the operations previously discussed. And the only fact that would be known about people in the open is their location. But information about these people is needed for rescue and for remedial moving, for example.

The shelter service would be the principal user of information about people. After the people leave the shelters, the shelter service would need to know something about everybody: for housing, for feeding, for reuniting families, and so on.

The medical service would have information about those who are ill or injured in medical facilities. The medical service is the principal user of this information but they can report it for other users. The police could also report on the numbers of people moved in remedial movements and their location. No other service would collect significant amounts of information about people.

It seems, then, that the collection of data about people should be assigned to the shelter service except for that about the ill and injured in medical facilities.

2. Attack. All operations -- at all levels -- need to know the attack situation but only metro would have all the information. Up to and including the dissemination of the warning, attack information can be made available to everyone. But once the movement to shelter begins, the availability of communications would control the availability of attack information below the metro level. This deficiency can be overcome by



- a. adopting the doctrine that the worst condition exists until notified differently.
- b. establishing some critical indicator -- such as, passing of a set period without a nearby detonation -- that can be known directly as signalling a change in the attack situation.

Both of these entail risks: the first the risk of not doing something beneficial; the second, of sustaining damage because the underlying assumption was proved incorrect.

3. Fire. Other operations than fire need to know the fire situation -- i.e., fire-black or not-black -- because the dose limitations are tied to the fire situation in current doctrine. Anyone at the work place would be able to observe some of the definitive characteristics of the fire black situation: nearby detonation, significant damage, or developing fires. Seeing any of these he can assume the condition is fire black and proceed accordingly at some risk of accepting more dose than was necessary. He might not understand an uncontrollable fire situation that resulted from other than a nearby detonation. In that case, he might return to the MSA unnecessarily. But he could be dispatched again without much loss of time because the distances involved would be relatively short.

#### SECTION INFORMATION PROBLEMS

Some of the information needed at section -- that about the condition of the service units at the MSA and about the availability of supplies and transport there -- is available there. Most of the other needed information would have to be obtained from some other place.

1. People. Information about the location of people is needed at section for dispatching units for a number of operations. In addition, information about numbers and condition is needed for some operations such as remedial moving and medical/collecting. It was seen above that the shelter service was the logical service to obtain site data about people. It was seen earlier on that a unit of the shelter service should be established at section to accumulate and coordinate requests from shelters for support and supplies. This unit should be expanded to coordinate the collection of field data about people -- this might be done from the shelters and would be done by the housing people -- to consolidate these data, and, if necessary, to go into the field to

to supplement the other sources.

## 2. Attack Environment.

a. Attack. The same condition would exist at section with respect to the attack situation as at site except that the probability of obtaining this information from metro should be more favorable. In any event, the solution would be the same.

b. Damage. Any unit of any service that was in the field could report the existence of damage either by communications from where it was or in person on its return to the MSA. This would be sufficient for a decision to dispatch units for emergency repair. However, a decision to abandon a facility or to undertake a major repair operation would probably require technical information, such matters as requirements for skills, equipment, materials, and so on. The best source of this kind of information is the operation and maintenance unit (building and street maintenance units) of the resource service operating from the MSA.

c. Debris. The problem here is similar to that related to damage. Again, partial information could be reported by any unit in or returning from the field. But the operation and maintenance unit (street cleaning unit) of the resource service would be the best source of complete information.

d. Fire. The problem here has two parts; i.e., two levels of information are needed:

(1) Information that fires exist.

(2) Information as to the fire situation: developing, uncontrollable, under control, and so on.

Some of the information about the occurrence of fires can be obtained from facilities -- shelter, medical, control, etc. -- so long as communications are possible. The fire watch unit of the fire service is charged with obtaining this information when communications are not possible and to supplement other sources in any event. The fire watch might also be able to recognize and report on developing fires. However, recognizing the other situations would require the expertise of the fire fighting units. They would have to decide what the fire

situation was and report it to section.

5. Radiation. Again, any unit in the field would be able to report on dose rates, provided it was equipped with a necessary instruments, and any unit returning to the MSA should report in person on dose rates it observed. However, section needs information about dose rates before it dispatches service units except in the fire black situation. A unit could be formed at section to make radiation surveys. However, the fire watch would already be in the field looking for fires. This unit could also make the radiation survey. This might mean sending a two-man team instead of a single observer but it would require only one vehicle while separate surveys would require two.

6. Planning at Section. Most of the operating decisions -- other than those made at the work place -- would be made at section. It was seen earlier on that planning for these decisions would require analyses of the situation and of operating capabilities. These, in turn, would require information about site conditions and system conditions. In some cases, this information would need to be something more than raw data. For example, the ability of the system to move would require consideration of both (1) the system condition -- personnel, equipment, and supplies -- and (2) the site conditions -- debris, fire, and radiation. All of the information would require as much validation as was feasible in order to judge its reliability. It seems, then, that the information group of the planning unit at section should be given the task of consolidating and validating the available information.

Control of operations can be simplified as in ALFA NEOP by classifying the situation by the combination of fire and radiation situations. The following four sets of conditions are possible

FIRE	RADIATION	
Code	Code	BOS
Black	Any	Any
(not black)	Red	2 & 3
(not black)	(not red)	2
(not black)	(not red)	1

The classification of the situation would be a function of the information group of the planning unit.

#### Operating Practice to Reduce Information Requirements.

Most primary operations require -- or may require -- one or more ancillary operations. For example, it is not unusual for fire fighters to be injured so as to require first aid and ambulance service. In normal times, communications are readily available and conditions are such that it is possible to call for these services after the injury occurs -- although this is not always desirable. But in the emergency operations situation, it may not be possible to wait in the normal way. The necessity for communicating the requirement information to section for dispatch of the needed unit can be eliminated by dispatching a task group. In the example, the task group would consist of a fire fighting unit of the fire service, a first aid unit of the medical service, and an ambulance unit of the police service. The makeup of such task forces can be identified from Figure 4.2.

#### INFORMATION AT ZONE AND METRO

Zone and metro would have similar requirements for information because the decisions to be made at each are similar. These two levels would not have problems of the kinds found at site and section. Information at zone and metro can be discussed most concisely in terms of the inputs and outputs related to the decisions made.

##### 1. Information Inputs.

- a. For establishing standard routes: location of clear routes for moving, by section.
- b. For remedial moving.
  - (1) Number of people to be moved, by section of origin.
  - (2) Situation -- fire and radiation -- by section.
  - (3) Available capacity of facilities suitable for receiving people being moved.
- c. For Support.
  - (1) Availability of support by type of unit, by quantity, by section.
  - (2) Requirement for support by type of unit, by quantity, by section.

d. For supply.

- (1) Availability of supplies in the warehouse by type and quantity by section.
- (2) Projected requirement for warehouse supplies by type and quantity, by section for some standard period.
- (3) Specific requirement for supplies by type and quantity, by section, by required time of arrival.

e. For housing, feeding, and welfare services (decision at metro)

- (1) Number of people, by section.
- (2) Availability of housing by number of units, by section.
- (3) Availability and capacity of facilities suitable for community lodging by facility, by geographic location.
- (4) Availability and capacity of facilities suitable for feeding large groups by facility, by geographic location.
- (5) Ability of utilities to supply service by geographic area.
- (6) Availability of facilities suitable for offices for billeting and welfare services by geographic location.

f. For establishing facilities. This would depend on the kind of facility and a number of other considerations and would have to be obtained on call when needed.

2. Information Outputs.

a. For standard routes

- (1) By zone: check point locations at section boundaries
- (2) By metro: check point locations at zone boundaries.

b. For remedial moving

- (1) Number of people to be moved.
- (2) Section of destination
- (3) Approximate times of departure and arrival.

c. For medical/collecting.

- (1) Summary of available capacity in all medical facilities, by facility

d. For support.

- (1) Type and number of units.
- (2) Origin: by metro, zone; by zone, section.
- (3) First destination: by metro, zone hq; by zone, section hq.

e. For supply.

- (1) Type and quantity
- (2) Section of origin

(3) Destination warehouse.

f. For housing, feeding, and welfare services: A plan including

- (1) Numbers of people to be housed in each kind of housing, by section.
- (2) Geographic locations of facilities to be used for community lodging and welfare services and time each will be required.
- (3) Geographic locations of facilities to be used for preparing and serving food, the approximate number to be fed in each, and the time each will be required.
- (4) Geographic locations of offices for billeting and welfare services and time each will be required.
- (5) Sections of origin and destination for specified numbers of people leaving shelters.
- (6) Authorization to move people from shelters when designated housing and feeding facilities are ready.

f. For establishing facilities.

- (1) Description of facility and identification of tenants.
- (2) Geographic location.
- (3) Time required to be ready.

INFORMING THE PUBLIC

All of the information discussed above would be required for and used in the operation of the civil defense system. But there is another information requirement: the people must be informed. The more the people know about the situation and about what is being done, the more likely they will be disposed to accept what is being done and the less likely they will be to believe false rumors. The information to be given the people must be as complete and as accurate as is feasible in the situation. But, above all, it must be believable. And to be believable, information must (1) come from a source accepted to be reliable and (2) be internally consistent.

The believability of a single piece of information depends almost entirely on the perceived reliability of its source. Given a rational listener or reader and time for him to reflect, the source having access to the most information ought to appear most reliable. This does not necessarily occur. People are not equally rational about all things and they tend to distrust the source of information they would

prefer not to believe. And there has been a trend toward generating distrust in sources that are best informed -- the "credibility gap" syndrome. But a sole source should appear more reliable than one of several competing sources. And for most of the emergency, metro can be the sole source of information for the public.

Source reliability is not important when the information coming from competing sources is internally consistent; i.e., when all sources say the same thing. In the critical period -- from the decision to achieve maximum readiness until people left the shelters -- some people would be informed through system channels (those in community shelters) and others through the media (chiefly, by radio.) Consistency can be improved -- but not assured -- by establishing a sole source. Metro would be the source for radio information. It might better, then, be established as the sole source for all information to be given by the system to the public in the emergency.

To lend authority to this emergency public information it should be released by the executive -- some given in person, some issued in his name. To assist the executive in this work is a staff operation that is different from the issuing of operating instructions. Therefore, it seems desirable to establish a staff unit at metro for this purpose. The input information requirements for this operation are beyond the scope of this study, but it seems likely that most of what would be needed would be made available to metro for operational purposes.

One item of information most to be desired by the people would be the location of family, relatives, and friends. This information is too voluminous and detailed to be made available through the emergency public information channels. It would be more appropriate to associate it with the welfare service of reuniting families. Therefore, it would seem appropriate for the data to be acquired by the shelter service and assembled at the metro information center. The assembled information could then be made available through the welfare service offices.

#### COMMAND INFORMATION

One part of commanding -- promulgating decisions -- has been



accounted for earlier on. The other -- reviewing results -- has not. For this, the executive must follow up on the effects of decisions he has made. And it would appear desirable that the executive keep informed as to the general situation and of the effectiveness of actions being taken even though he has not been asked for a decision. Much of what needs to be known for both of these would already be available because of operational requirements discussed above. What else would be needed is beyond the scope of this study. Activity reports are usually desired but reporting on activity sometimes gets in the way of activity. In any event, the planning unit of the staff would conduct the review operation for the executive.

#### INFORMATION FLOW

Normally, information flow is diagrammed. But a comprehensive diagram would be illegible at any size that would conveniently fit into this report. So, in lieu of a diagram, the information flow derived from the preceding discussion has been tabulated in Figure 6.5. The routing of the information shown there was decided on the basis of efficiency. An item of information was addressed directly to the user unless it was going to be sent to another headquarters without change in which case, it was addressed first to the information center. It would be logical to assemble all pertinent information in the information center. Therefore, some information addressed to a user would be expected to reach the center eventually. This would generate some additional internal flow in headquarters; it was omitted here for convenience. Also omitted for convenience were the flows of advice from the special staff to the executive and staff at zone and metro.

Information Flow: SITE TO SECTION		
Information	Origin At Site	Destination At Section
People Data	Shelter or Welfare	Shelter Unit
Available Capacity in Med. Fac.	Medical/Facility	Medical Unit
Disease Data	Medical/Mobile	
Vector Data	Resource/Vect.Contr	Information Center
Weather Data	Fire Watch	
Surface Data		
Fire Data		
Radiation Data		
Fire Situation Information	Fire Fighting	
Damage Data	Resource/Street Mnt	
	Resource/Bldg.Mnt.	
Debris Data	Resource/Street Cln	
Supply Requirements Support Requirements	Shelter or Welfare	Shelter Unit
	Medical/Mobile	Medical Unit
	First Aid	
	Medical/Facility	Fire Unit
	Fire Watch	
	Fire Fighting	
	Rescue	Police Unit
	Movement	
	Control	
	Criminal	
	Facility/Facil.Opn	Resource/Facil.Opn
	Resource/Street Cln	Resource/Opn & Mnt
	Resource/Street Mnt	
	Resource/Bldg.Mnt	Resource/Wat & Sew
	Water or Sewage Plt	
	Trash	Resource/Sanitation
	Vector Control	
	Supply	Resource/Services
	Transport	
	Task Force	Exec/Planning Staff

Fig.6.5 INFORMATION FLOW

Information Flow: AT SECTION		
Information	Origin at section	Destination at Section
People Data	Shelter Unit	Information Center
Available Capacity in Med. Pac.	Medical Unit	
Disease Data		
Weather Data		
Surface Data	Any Unit	
Partial Data on Fire, Radiation, Damage, Debris	Returning to MSA	
System ConditionData Support Requirements	Shelter Unit	Planning Staff
	Medical Unit	
	Fire Unit	
	Police Unit	
	Resource Unit	
People Information		Information Center
Site Condition Information		
System Condition Information		
Operating Instructions from Zone	Executive	
Standard Route Information		Police Unit
Avail. Capacity in All Med. Pac.	Information Center	
Operating Situation Classification	Planning Staff	All Units
Alternative Action Proposals	Planning Staff	Executive
Decision	Executive	Operations Staff
Operation Instructions		Shelter Unit
		Medical Unit
		Fire Unit
		Police Unit
		Resource Unit
Supply Requirements	Shelter Unit	Resource/Services
	Medical Unit	
	Fire Unit	
	Police Unit	
	Resource Unit	
	Resource/Bldg. Opn	
	Resource/Sanitation	
	Admin.Serv.Unit	

Fig.6.5 INFORMATION FLOW

Information Flow: SECTION TO ZONE		
Information	Origin at Section	Destination at Zone
Clear Route Information	Information Center	Information Center
People Information		
Avail.Capacity of Recept.Facil.		
Avail.Capacity of Housing Facil.		
Avail.Capacity of Feeding Facil.		
Avail.Capacity of Welfare Facil.		
Operating Capability of Utilities		
Operating Situation Classification	Planning Staff	Planning Staff
Availability of Support		
Requirement for Support		
No.of People in Remed.Movement	Operations Staff	
Availability of Supplies	Resource/Services	Resource/Services
Requirements for Supplies		
Decisions at Section	Operations Staff	Information Center
Avail.Capacity in Medical Facil.	Information Center	Information Center
Information Flow: SECTION TO SITE		
Information	Origin at Section	Destination at Site
Operating Situation Classification Weather Forecast Information	Planning Staff	Shelter
		Medical Facility
		Resource/Wat&SewPlt
Emergency Public Information	Information Center	Shelter or Shelter/Welfare
		Medical Facility
Consolidated People Information	Information Center	Shelter/Welfare
Information Flow: AT ZONE		
Information	Origin at Zone	Destination at Zone
Clear Route Information	Information Center	Planning Staff
People Information		
Avail.Capacity of Recept.Facil.		
Alternative Action Proposals	Planning Staff	Executive
Decision	Executive	Operations Staff

Fig.6.5 INFORMATION FLOW

Information Flow: ZONE TO METRO		
Information	Origin at Zone	Destination at Metro
Clear Route Information	Information Center	Information Center
People Information		
Avail.Capacity of Recept.Facil.		
Avail.Capacity of Housing Facil.		
Avail.Capacity of Feeding Facil.		
Avail Capacity of Welfare Facil.		
Operating Capability of Utilities	Planning Staff	Planning Staff
Operating Situation Classification		
Availability of Support		
Requirement for Support		
No.of People in Remed.Movement	Operations Staff	Resource/Services
Availability of Supplies	Resource/Services	
Requirement for Supplies	Information Center	Information Center
Decisions at Section	Operations Staff	
Decisions at Zone	Information Center	
Avail.Capacity in Med.Facil.	Information Center	
Information Flow: ZONE TO SECTION		
Information	Origin at Zone	Destination at Section
Movement Instructions	Operations Staff	Executive
Support Instructions		
Hous.,Feed.,& Welfare Serv.Plan		
Facility Estab. Instructions		
Standard Route Instructions	Information Center	Information Center
Avail.Capacity in All Med.Facil.		
Consolidated People Information		
Emergency Public Information		
Attack Situation Information	Planning Staff	Planning Staff
Weather Forecast Information	Resource/Services	Resource/Services
Supply Instructions	Admin.Serv.Unit	Resource/Services
Supply Requirements		

Fig.6.5 INFORMATION FLOW

Information Flow: AT METRO		
Information	Origin at Metro	Destination at Metro
Clear Route Information	Information Center	Planning Staff
People Information		
Avail.Capacity of Recept.Facil.		
Avail.Capacity of Housing Facil.		
Avail.Capacity of Feeding Facil.		
Avallability of Welfare Facil.		
Operating Capability of Utilities		
Alternative Action Proposals	Planning Staff	Executive
Decision	Executive	Operations Staff
Standard Route Information	Operations Staff	Emerg.Pub.Info.Staf
Decision at Metro		
People Information	Information Center	
Decisions at Zone		
Decisions at Section		
Operating Situation Classification	Planning Staff	
Emergency Public Information	Emerg.Pub.Info.Staf	Public
Information Flow: METRO TO ZONE		
Information	Origin at Metro	Destination at Zone
Movement Instructions	Operations Staff	Executive
Support Instructions		
Hous.,Feed.,& Welfare Serv.Plan		
Facility Establish.Instructions		
Standard Route Instructions		
Avail Capacity in All Med.Facil.	Information Center	Information Center
Consolidated People Information		
Emergency Public Information	Emerg.Pub.Info.Staf	
Attack Situation Information	Planning Staff	Planning Staff
Weather Forecast Information		
	Resource/Services	Resource/Services
Information Flow: METRO TO SECTION		
Information	Origin at Metro	Destination at Section
Supply Requirements	Admin.Serv.Unit	Resource/Services

Fig.6.5 INFORMATION FLOW

When the organization has been designed and formed, it must be described. What is to be done and by whom must be written down and published so that all concerned can know what is intended. However, before getting into that, it appears desirable to summarize briefly what has been done in the preceding discussion. Some of it must have appeared somewhat disjointed, e.g., operations were listed and defined and then later on others were added; operation assignments were made and later changed as one logic supplanted another. But this is the way of organizing; many compromises must be made; and everything except the objectives is tentative until the end of the process.

#### THE ORGANIZING PROCESS

Organizing is the process of designing and building a structure of people for the administration of work to be performed by a group acting in cooperation, assigning them duties and authority, and supplying them with the necessary operating rules and procedures and resources.

Objectives. Work to be done must be purposeful -- it must have some objective -- to be worth organizing. Thus the first step must be to establish the objectives of the group and for each subordinate element of the group. And the subordinate objective must be consistent with the overall objectives.

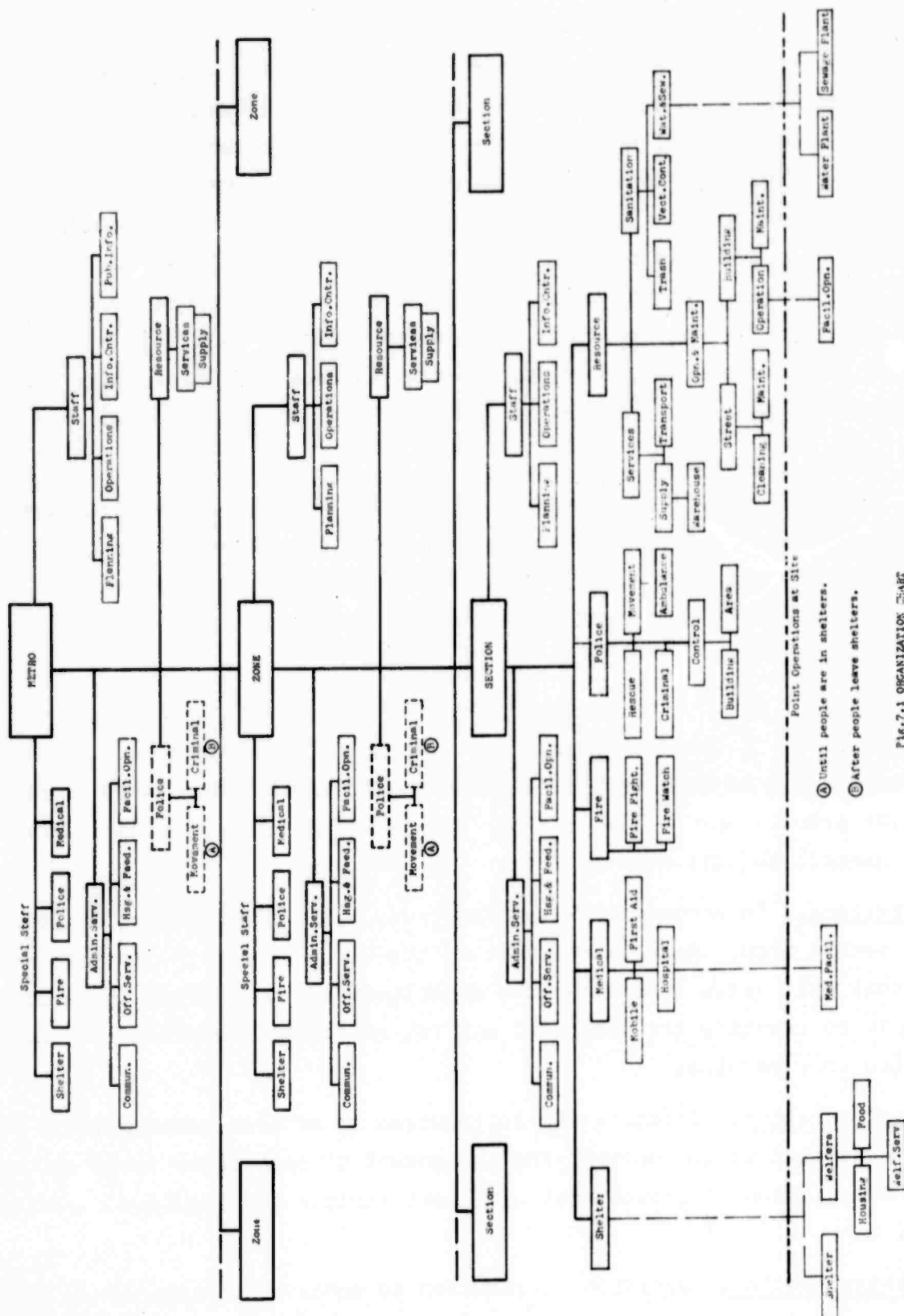
Operations. To accomplish the objectives, kinds of work must be done. The second step, then, is to identify the kinds of work -- operations -- that will serve to achieve the objectives and to analyze these operations to identify the personnel skills, equipment, supplies, and facilities they require.

Departmentation. Coordination is required to achieve cooperation. So the next step is to identify the assignment of operations to groups and the association of groups that will best achieve the required coordination.

Decentralization. Decision is required to achieve coordination. Thus,

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the next step is to assign authority to those who supervise the associated groups. This authority is delegated down from the supreme authority at the top.

Structure. Given preferred patterns of departmentation and decentralization that are different -- the usual case -- designing the structure of the organization requires compromises.

Information. Decision requires knowledge and information is needed to fill gaps in knowledge. Information flows along the structure of the organization. Therefore, the next step is to identify the information required and its sources and destinations.

Forming the Organization. Once the groups needed to perform the operations have been identified and the structure of the organization has been designed, the next step is to decide where the people, equipment, supplies, and facilities are to come from and how they will be brought together into an effective, efficient organization.

Describing the Organization. This is the recording of the result of the organizing process to serve largely as a basis for training and, in a limited way, for controlling operations.

#### ORGANIZATION CHART

The organization chart is a graphic representation of the skeleton of the structure of the organization. It identifies the units of the organization and the flow of authority from top to bottom and no more. The identification of the units serves as a directory for the organization manual.

Figure 7.1 is an organization chart for the organization plan developed as an example in this study. The details of the organization at the lowest level are not shown. In some cases, e.g., the shelter, more detail is given earlier on in the text. In others, e.g., the fire service, the organization of the fire department would be continued. In others, e.g., the medical service, the detailed organization would depend on what there was in the locality to be organized.

#### ORGANIZATION MANUAL

The organization manual is a record of (1) the objectives, (2) the

duties of every unit and position and (3) of the authority of every position in the organization. It is needed so that everyone in the organization will have a common basis for forming expectations of what everyone else in the organization will do. Whether these expectations will prove reliable depends on how each member of the organization does his job and this will vary as widely as people vary. Therefore, the manual is not a completely satisfactory substitute for operating experience but, when the organization is not experienced, the manual must serve.

The manual assigns objectives, duties, and authority to positions rather than to people because, if any organizational change can be predicted, it is that personnel will change. People come and go. This is especially true of the civil defense emergency organization because it will operate in war. The situation is quite close to that of the military. And Dale and Urwick note that, because war leads to casualties, military organizations are structures of positions.<sup>1/</sup>

Assignments of duties should be in general terms and should describe what is to be done, not how it is to be done or why. The organization manual is not an instruction book. And the purpose of the duties is expressed in the objective statement.

Assignments of authority are made to position rather than to units. The exercise of authority is personal. Groups can plan or review or perform but only one man can decide. As the saying is, "Command is a lonely thing." These assignments of authority are made in the form of identifying the major decisions that the man in the position is authorized to make. It is neither feasible nor desirable to identify every decision that may be made by a man in a position. Most of the decisions that will be made are minor and the authority to make them is inherent in the assignment of duties. And it is unlikely that anyone could identify in advance all of the decisions to be made.

Sample pages of an organization manual are shown at the end of this chapter. One page per unit or position seems desirable because

- a. it permits the use of a form thus aiding in obtaining orderliness and completeness.

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1. Ernest Dale and Lyndall F. Urwick, Staff in Organization, McGraw-Hill, (New York: 1960).

- b. it forces conciseness by limiting space, and
- c. it makes it easy to revise the manual when the inevitable change in organization plan is made -- before not during the emergency.

#### OPERATIONS PLAN

The final step in the organizing process is to write and publish the operating plan. This plan specified two items

- a. what is to be done and
- b. under what circumstances it is to be done.

The purposes of the operations plan are to help assure that (1) what should be done is done when it should be and (2) what should not be done is not done.

The operations plan should not include what position should do what; that is in the organization plan. It can include a staffing plan. This staffing plan should tentatively designate people by name or, preferably, by pre-emergency position to fill specific positions. And because (1) the designated person may not arrive at his designated position or (2) may not be able to perform his duties because of incapacity or loss of communications. The staffing plan should provide for succession to positions.

The operations plan should contain the information plan. This plan should identify every piece of information to be moved regularly, (1) its specific content and form, (2) its source and destination, and (3) its timing; i.e., when it is to be obtained and/or sent. The information plan should not specify how the information is to be obtained or transmitted. It is impossible to predict with assurance and accuracy what communications capabilities will exist in a nuclear emergency. The design of the system and its organization will provide communications capabilities and ways to use them can be taught. But the ways should not be specified because this will inevitably depend on the contingencies of the situation and the ingenuity and resourcefulness of the communicators.

The plan should not contain extraneous material. For example, it is inappropriate for the plan to explain the purpose of an operation.

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It is well understood that a man will do his job better if he knows why he is doing it. But this is a consideration for training not for planning. And it is inappropriate for the plan to explain how to do an operation. This is a matter of skill, again a consideration for training.

Of course, the plan can contain standard operating procedures. These are convenient. They provide for the organization the habit patterns of the individual. But standard procedures presume standard conditions. Again it would be accidental if standard conditions were to obtain in the emergency. Groups -- e.g., the fire department -- brought into the emergency organization will usually have standard procedures of their own and the emergency would be no time to attempt to change them. Therefore, any standard operating procedures should be those necessary for the operation of the emergency organization. And these should be general rather than specific and they should specifically permit deviations when they cannot be followed rigorously.

## ORGANIZATION MANUAL

### Unit Description.

Unit: Zone Headquarters.

Superior Unit: Metro Headquarters

Subordinate Units: Section Headquarters.

Objective: To maximize the capability of the emergency forces to minimize injury to people and damage to property in the territory assigned to the zone.

- Duties:
1. To assign operating capabilities available in the zone to the subordinate sections in accordance with the need.
  2. To allocate supplies available in the zone to the subordinate sections in accordance with the need.
  3. To coordinate solutions to problems in strategic or tactical movements involving two or more sections subordinate to the zone.
  4. To coordinate suppression of criminal activities involving two or more sections subordinate to the zone.
  5. To select the section of destination for a remedial movement that cannot be completed within a subordinate section but can be completed within the zone.
  6. To request operational support or supplies from metro when requirements exceed availability within the zone.
  7. To supply information to metro and to the subordinate sections in accordance with the information plan.
  8. To instruct the subordinate sections as to the actions to be taken pursuant to decisions made at zone or at metro.

## ORGANIZATION MANUAL

### Unit Description

Unit: Fire Group.

Superior Unit: Section Headquarters.

Subordinate Units: Fire Companies  
Fire Watch Units.

Objective: To maximize the capability of the Fire Service to minimize injury to people and damage to property by fire in the territory assigned to the section.

Duties:

1. To provide Fire Companies staffed, supplied, equipped, and ready for dispatch to suppress fires or inhibit fire spread.
2. To provide Fire Watch units, staffed, supplied, equipped, and ready for dispatch to find fires and monitor dose rates.
3. To select the Fire Companies to be dispatched for operations or for support.
4. To schedule Fire Watch units.
5. To instruct Fire Companies and Fire Watch units in operating doctrine.
6. To supply information on the condition of the Fire Service to the Planning Staff at section in accordance with the information plan.



## ORGANIZATION MANUAL

### Unit Description

Unit: Fire-Engine Company.

Superior Unit: Fire Group (at MSA)  
Task Force (at site)

Subordinate Units: None.

Objective: To minimize injury to people and damage to property by fire at the place to which dispatched.

Duties:

1. To extinguish fires.
2. To prevent the spread of fire.
3. To supply information to the Information Center at section Hq. in accordance with the information plan.

## ORGANIZATION MANUAL

### Position Description.

Position: Zone Executive

Superior: Metro Executive

Subordinates: Section Executives  
Chief of Staff at Zone Hq.  
Special Staff Officers at Zone Hq.  
Heads of Police and Resource units at Zone Hq.  
Head of Administrative Services unit at Zone Hq.

Objective: To maximize the effectiveness of Zone Hq. and of the emergency forces in minimizing injury to people and damage to property in the territory assigned to the zone.

Duties: 1. To make and promulgate authorized decisions.  
2. To review the effects of these decisions.  
3. To review the effectiveness of emergency operations in the Zone.  
4. To review the operation of Zone Hq. and to take such action as may be necessary to improve performance.

#### Authorized Decisions:

1. Number and types of units and Section of Origin for support to Sections within the Zone.
2. Type quantity, and Section of origin of supplies for Sections within the Zone.
3. Section of destination for remedial movements between Sections within the Zone.
4. Request for support or supplies from Metro.
5. Establishment of a new facility within the Zone.

## ORGANIZATION MANUAL

### Position Description

Position: Fire-Engine Company Chief.

Superior: Fire Group Chief (at MSA)  
Task Force Chief. (at site)

Subordinates: Engine Driver  
Firemen

Objective: To maximize the effectiveness of the Engine Company in minimizing injury to people and damage to property by fire at the work site.

Duties: 1. To make technical decisions as to methods to be used.  
2. To assign specific duties to subordinates.  
3. To review the effects of the operations performed.  
4. To form an opinion as to whether the fire is developing, under control, or uncontrollable.

#### Authorized Decisions:

1. Technical fire fighting matters.
2. Fire situation at site.
3. If operating independently, when to leave site.

## ORGANIZATION MANUAL

### Position Description

Position: Fireman

Superior: Fire-Engine Company Chief.

Subordinates: None.

Objective: To maximize the effectiveness of the Engine Company in minimizing injury to people and damage to property by fire at the work site.

Duties:

1. To perform such activities as are assigned by the Company Chief.
2. To cooperate with his associates in performing joint activities.
3. To supply information about site conditions on request of Information Center at Section Hq.

#### Authorized Decision:

1. To succeed to the position of Company Chief in accordance with the succession plan when the Chief is disabled at the work site.

## VIII. ALTERNATIVES

The organization pattern shown above was developed as a means of demonstrating the method. In appropriate local conditions it would serve well. However, conditions in many localities might not be appropriate for it for a number of good and sufficient reasons. Chief among these are two:

1. Normal organization. The normal, day-to-day, organization pattern of the locality may differ so much from the emergency organization shown above that the change to emergency operations would require the equivalent of a major reorganization. This would likely seriously degrade the effectiveness and efficiency of the emergency organization for the duration of the emergency.

2. Personnel. The work of organizations is done by people and must reach their working pattern by adjustment to fit the capabilities of their staff. In any given locality, the particular capabilities of the available personnel may not fit well into the emergency organization developed above.

As this study proceeded, a number of alternatives were identified and choices were made for the reasons given. But in a specific locality other choices might have been made because of local conditions. Whenever the method of organizing demonstrated above is applied, the major local organizing effort would be applied in making these choices. Therefore it appears desirable to discuss the major alternatives that should be considered.

### SHELTER AND WELFARE: ONE SERVICE OR TWO?

In essence the shelter job and the welfare job are the same: to house and feed the people in a safe, clean environment when they cannot care for themselves. But there are differences. In the welfare situation other needs -- utilities, medical care, fire and police protection, etc. -- are filled by independent elements of the organization: the fire, police, medical, and resource services. In the shelter situation, these needs must be filled by the shelter service. In this, shelter

would be equivalent to a military unified command; welfare, to a military specified command.<sup>1/</sup>

Limited availability of management personnel favors a combined service. Both operations -- shelter and welfare -- would require large numbers of management personnel. They would operate in situations in which other elements of the organization would also require large numbers of management personnel. But shelter and welfare would operate in mutually exclusive situations. It seems, then, that to establish and train two management structures when only one of them can operate at a time would clearly violate the criterion of efficiency.

On the other hand, limited availability of personnel with pertinent experience might favor separate services. Normal local government does not have any operation equivalent to sheltering or to housing and feeding in the emergency situation. Shelter leaders and welfare group managers would require some training. And it might prove less difficult to train different people in the separate jobs. In that case separate services might be more desirable.

However, there are more similarities than differences between the shelter leader and welfare group manager jobs. Therefore, it would seem that the efficiency of the single service would tend to be the decisive consideration.

#### RESCUE: FIRE, POLICE, OR RESOURCE SERVICE?

In normal circumstances, rescue operations are usually performed by the fire department largely because the need for rescue is usually associated with fire. In other cases -- especially when the use of heavy equipment is required -- rescue tends to be performed by ad-hoc groups under the direction of whatever unit of government is in charge at the site.

In organizing for emergency operations, three options for assignment of the rescuing function are available:

- a. To the Fire Service, because the existing fire department may have rescue units and because some rescue would be associated with fire fighting.
- b. To the Police Service, because rescuing would invariably be

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1. See Chapter II.

associated with remedial moving which is a logical police service function.

- c. To the Resource Service, because rescuing would often require heavy equipment and all other functions requiring heavy equipment are assigned to elements of the resource service.

It would be illogical to preclude all rescue operations by the Fire service because some is incidental to fire fighting. Therefore, it would be advantageous to include such incidental rescue activities in the Fire service assignment. But it would be inefficient to divert the attention of the Fire service to such rescue activities as assuring that all people had left a building that was being evacuated for some reason other than fire. When rescuing is needed in an emergency, it can be expected that all of the special fire fighting capability of the Fire service would be needed for fighting fire.

Assignment of the rescuing function to the Resource service might gain some efficiency in the use of heavy equipment. But it would add to the number of functions assigned to the Resource service and thus to the difficulty in management.

Assignment of rescuing to the Police service would aid in the coordination of all the operations involved in a remedial movement. In the emergency circumstances in which rescuing would be required, remedial moving would be the principal function of the Police service. This would tend to increase efficiency in the employment of available personnel. On the other hand, it would require the Police service to assume a function it does not normally perform.

#### AMBULANCE SERVICE: MEDICAL OR POLICE SERVICE?

The ambulance service -- F 10.1, Medical Care/Collecting -- could be assigned to several services:

- a. To the Fire or Police Service, because one of them supplied ambulance service in normal circumstances.
- b. To the Medical Service, because first aid treatment is often given to the patient in the ambulance and because hospitals sometimes supply ambulance service.
- c. To the Resource Service, because it would operate the motor pool.

Of these, the Fire service can be eliminated because of the



desirability of concentrating its efforts on fire fighting. The Resource service can be eliminated because it can do its job well enough by making vehicles available to the ambulance unit. This leaves the Police and Medical services.

In one way, the Medical service would seem to be the logical assignee of the ambulance function. The hospitals would have the best information as to their available capacity and therefore as to ambulance destination. But this would be significant only when the ambulances operated from the hospitals and this is incompatible with the two operating concepts: the MSA and the task force. Assignment of the ambulance function to the Medical service might also increase efficiency in employment of medical personnel. But the effectiveness of first-aid personnel might be greater if they were to operate from the MSA.

Operation of the ambulance service would often accompany F3, Moving; i.e., the ill and injured would be moved when the well people were. In that case, it would be more efficient to assign the ambulance function to the Police service. It seems likely that this would be the preferred solution in most cases.

#### RESOURCE SERVICE: ONE SERVICE OR TWO?

In the emergency organization developed in this study the Resource service was assigned functions related to two kinds of resources: fixed and moveable. Those related to fixed resources include: debris clearance, repair and replacement, decontamination, and operation of facilities. Those related to moveable resources include: supply, transport, and control of \*resources.

It would be possible, then, to divide the Resource service into two: a Public Works service and a Supply service. In governments, it is done both ways: some have one service; some have two.

The principal advantage in a single resource service lies in the improved coordination -- a major part of the supply and transport activity -- supports the public works activity. And a large part of the public works activity is performed to enable the supply and transport

functions to operate. On the other hand, the single service is larger and introduces one additional level of supervision.

#### LEVELS OF MANAGEMENT

It was shown in Chapter IV that there would be two levels of management in any event: a top Command (Metro) and a working level Command (site). In addition, when the size of the locality exceeded the established limits of a zone, there would be -- in current doctrine -- a third level: an intermediate Command (zone.) We examined the desirability of another intermediate level of Command (section) to be established in conjunction with a MSA and found it desirable.

Given a locality large enough to require more than one operating zone, two choices are possible

- a. whether to have one intermediate level of management or two, and
- b. if it is decided to have one, whether it should be the section or the zone.

Most of the emergency operations are area-type; i.e., the forces are dispatched from the MSA to the work site. It is to be expected, then, that most operating decisions as to employment of forces would best be made at the MSA. Therefore, it appears highly desirable that a coordinating command be established at the MSA. In the terms used in this study, this is the section headquarters.

The principal advantage in establishing a section headquarters is in the reduction of the requirement for electronic communications and the consequent increase in reliability. For the most part, the section headquarters would obtain the information it needed for operations within its area from face-to-face oral reports by monitors and work crews returning to the MSA. Electronic communications within its area might expedite activities some but their loss would not seriously degrade operational effectiveness. To the contrary, coordination of field activities at zone or metro would necessarily depend heavily on electronic communications and their loss would seriously affect performance.

Whenever section headquarters are established, the functions to

be performed at zone would be much the same as those at metro. With zone headquarters, zone would coordinate the sections; metro, the zones. Without zone headquarters, metro would coordinate sections directly. If the number of sections is large, coordination by zone should be more efficient because of the dividing of the work load among the zones. But if the number of sections is small, the zone headquarters might be an unnecessary lengthening of the chain of command. The zone headquarters would offer increased probability of having some inter-section coordination because there should be a higher probability of survival of one of several zone headquarters as compared to a single metro headquarters.

On the other hand, most localities do not normally have intermediate management levels to coordinate the work of several government departments. Inter-departmental coordination is applied at the top; lower levels rely on cooperation. To introduce intermediate levels -- section or zone -- in the emergency organization would be truly a reorganization. Whether it would prove successful or not would depend to a large extent on the people involved and the effectiveness of preparations for it.

#### COMMUNICATIONS: VERTICAL OR LATERAL?

In vertical communications, each headquarters talks only to the headquarters immediately above it and below it in the chain of command. In lateral communications, each headquarters talks not only to those above and below it but also to others at its level. The organization pattern designed in this study presumed vertical communications.

Vertical communications are more efficient than lateral in terms of communications. This may not be so in terms of operations or functioning of the organization. But a major purpose of organizing is to provide information where decisions are made. And the choice of a communications pattern affects -- and is affected by -- organization structure, delegation of decision authority, and operating practice.

Coordination is best with vertical communications because instructions to the coordinated units can come only from the superior. Cooperation is best with lateral communications because the cooperating

units can talk to each other. The choice between vertical and lateral communications, then, would depend largely on whether correlation of activities was intended to be obtained by coordination or cooperation.

The choice of vertical vs. lateral communications can affect succession to command. For example, given a metro headquarters and a number of zone headquarters. If only vertical communications are available no one of the zone headquarters can succeed metro if metro is lost because no one of the zones could talk to the others. Each zone could succeed only to metro authority as it applied to that zone and this would be meaningless because each zone headquarters would already have all the authority it needed within its area. So, if it were desired to provide succession to command and vertical communications for operations, it would be necessary to provide standby lateral communications to be used when succession became necessary. This might not be too difficult with wireless communications but it might be quite difficult with land lines.

Table A.1 ALFA NEOP EVENTS

		Event
A. CRISIS	I	Threatening international development.
	II	Decision to commence internal government readiness actions.
	III	Decision to commence alerting forces and expanding local capabilities.
	IV	Decision to commence mobilizing emergency forces.
	V	Advised by NEXTUP to attain maximum readiness posture.
	VI	Advised by NEXTUP to decrease level of readiness.
	VII	Attack warning received or attack without warning.
B. WARNING	I	Attack warning is received.
	II	Distant weapon detonation observed or reported.
	III	Movement to shelter is completed.
	IV	Six hours elapse without attack in NEXTUP area.
	V	Advised by NEXTUP that danger of attack is over.
	VI	Observation or report of nuclear detonation in vicinity.
C. NEGFIRE	I	Observation or report of nuclear detonation in vicinity - effects uncertain.
	II	Survey indicates damage and fires present negligible threat to zone.
	III	Six hours elapse without additional attack in NEXTUP area.
	IV	Advised by NEXTUP that further attack is unlikely.
D. LOFIRE	I	Significant damage and/or developing fires reported in zone.
	II	Fire chief advises that fires have been brought under control throughout zone.
	III	
	IV	Advised by NEXTUP that further attack is unlikely.
E. HIFIRE	I	Fire chief advises that fires are uncontrollable in areas susceptible to mass fire.
	II	Fire chief advises mass fire contained; fires under control in remainder of zone.
	III	Fire chief advises that residual fires present negligible threat to survivors.
	IV	Advised by NEXTUP that further attack is unlikely.

## Appendix A.

### ALFA NECP EVENTS.

For convenience in performing this study and in reporting the findings, numbers were assigned to the several events within each of the ALFA NECP Plans. These assignments are shown in Table A.1.

## DEPARTMENTATION ANALYSES

In this Appendix are given matrices that record the detailed analyses of operations with respect to process, persons served, and place.

Figure 8.1 shows operations in the rows and process characteristics in the columns. Each cell asks the question, "Does this operation require this type of personnel (type of equipment, etc.)?"

Figure 8.2 shows operations in the rows and types of people -- characterized either by location or by condition -- in the columns. Each cell asks the question, "Does this operation serve people in this location (in this condition)?"

Figure 8.3 shows operations in the rows and in the columns, (1) an identification of the smallest operating unit, (2) the type of operation, and (3) the area served.

			PROCESS																										
			1.Personnel						2.Equip		3.Supplies				4.Facilities														
			1.Sp.Skill Req.						1.Technical	2.Admininstr	3.Medical	1.Skilled	2.Equip.Opr.	3.Unskilled	1.Vehicle	2.Construction	3.Special	1.Medical	2.Food	3.Water	4.Building	5.Misc.	1.Shelters	2.Control	3.NSA	4.Medical	5.Welfare	6.Communication	
EMERGENCY OPERATIONS	P.Functions	1.Sheltering	1.Shielding																										
			2.Controlling Environment																										
			3.Providing Utilities																										
			4.Medical Care																										
			5.Maintaining Health																										
			6.Fire Fighting																										
			7.Maintaining Law & Order																										
			8.Feeding & Housing																										
			9.Decontaminating																										
		2.Warning	1.Alerting																										
			2.Informing																										
		3.Moving	1.Strategic																										
			2.Tactical																										
			3.Remedial																										
		4.Rescuing																											
		5.Maintain. Health	1.Sanit	1.Oper.Water Treat.Pl.																									
				2.Oper.Sewage Treat.Pl.																									
				3.Dispos. g of Trash																									
2.Ctr. Dis.	1.Innoculating																												
		2.Quarantining																											
		3.Isolating																											
3.Controlling Vectors																													
6.Fire Fight.	1.Prevent.	1.Active																											
		2.Passive																											
	2.Inhibit.	1.Passive																											
		2.Active																											
2.Suppress.	1.Watching																												
	2.Fighting																												
7.Maintain. Law & Ord.	1.Suppr.Crime																												
	2.Maint.Order																												
8.Protecting Livestock																													
9.Emergency Shut Down																													
10.Medic.	1.Collecting																												
2.Treat	1.First Aid																												
2.General Care	1.Home																												
2.Facility	1.Home																												

Fig.B.1. DEPARTMENTATION BY PROCESS



			PROCESS																	
			1. Personnel						2. Equip		3. Supplies				4. Facilities					
			1. Sp. Skill Req.	2. Prof.			1. Vehicle	2. Construction	3. Special	1. Medical	2. Food	3. Water	4. Building	5. Misc.	1. Shelters	2. Control	3. MSA	4. Medical	5. Welfare	6. Communication
				1. Technical	2. Administr.	3. Medical														
EMERGENCY OPERATIONS	F. Functions	11. Feeding	1. Prep. & Serve																	
			2. Distrib. Food																	
		12. Housing	1. Billeting																	
			2. Commun. Lodging																	
		13. Restor. Facil	1. Clear Debris																	
		2. Repr. & Repl.																		
	14. Decontam	1. Facilities																		
		2. Terrain																		
	15. Welfare Services																			
	1. Organizing	1. Assigning Authority	1. Internal																	
			2. External																	
		2. Staffing																		
		3. Supply Resources	1. Support																	
			2. Supplies																	
		3. Transport																		
	4. Control																			
	4. Establish Facilities																			
K. Controls	2. Planning																			
	3. Informing	1. Data	1. Acquiring	1. People																
				2. Resources																
			3. Site Conditions	1. Nat. Envir	①															
				2. Att. Envir	②															
		4. System																		
		2. Processing																		
		3. Storage & Retrieval																		
	2. Comm.	1. Wireless																		
		2. Telephone & Telegraph																		
3. Messenger																				
4. Deciding																				
5. Commanding																				

- ① Special technical skill required for weather forecasting.  
Medical skill required for diagnosing disease.
- ② Special skills required for monitoring radiation  
and deciding fire condition.

Fig.B.1 DEPARTMENTATION BY PROCESS

PERSONS(served)											
1.By Location						2.By Cond					
1.Normal Distrib.						1.Commun.Shelter					
2.Moving						2.Home Basement					
3.Refuge						4.In Open					
4.In Homes						5.In Facilities					
1.All						2.Well and Able					
3.Ill						4.Injured					
OPERATIONS											
1.Sheltering			1.Shielding			6.Fire Fight.			1.Active		
			2.Controlling Environment			1.Prevent			2.Passive		
			3.Providing Utilities			2.Inhibit			1.Passive		
			4.Medical Care			2.Suppressing			2.Active		
			5.Maintaining Health			1.Watch			1.Watch		
			6.Fire Fighting			2.Fight.			2.Fight.		
2.Warning			7.Maintain.Law & Order			7.Maintain			1.Suppress.Crime		
			8.Feeding & Housing			Law & Ord			2.Maintain.Order		
			9.Decontamination			8.Protecting Livestock			9.Emergency Shut Down		
3.Moving			1.Alerting			1.Collecting			1.First Aid		
			2.Informing			2.General Care			1.Home		
			1.Strategic			2.Facility			2.Facility		
4.Rescuing			2.Tactical			11.Feeding			1.Prep.& Serve		
			3.Remedial			2.Distribut.Food			2.Distribut.Food		
			1.Oper.Water Treat.Plnt			1.Billeting			2.Commun.Lodging		
5.Maint. Health			2.Oper.Sewag.Treat Plnt			12.Housing			1.Restor.		
			3.Dispos.of Trash			13.Restor. Facilities			2.Repr.& Repl.		
			1.Innoculating			14.Decontam			1.Facilities		
6.Maint. Health			2.Quarantining			15.Welfare Services			2.Terrain		
			3.Isolating								
			3.Controlling Vectors								

FIG. B.2 DEPARTMENTATION BY PERSONS



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